May 1955

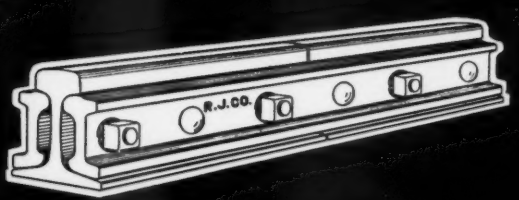
RAILWAY TRACK and STRUCTURES

One of Five Specialized Railway Age Publications

Wherever Track Standards Are High and Economy Vital . . .

It's RAJO

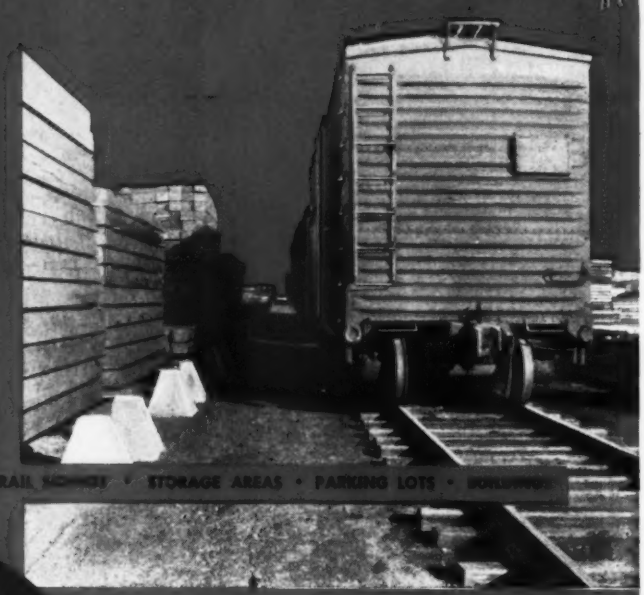
"The Best in Rail Joints"



THE RAIL JOINT COMPANY, INC.

50 Church St., New York 7, N.Y.

NEW ready-to-use weed killer



NEW UREABOR DESTROYS VEGETATION ABOUT FENCE LINES • RAIL SIDINGS • STORAGE AREAS • PARKING LOTS • BUILDINGS

UREABOR*

WEED and GRASS KILLER

LOW-RATE OF APPLICATION—
EFFECTIVELY DESTROYS WEEDS AND GRASSES
NOTHING TO MIX—NO WATER TO HAUL
NONCORROSIVE • NONFLAMMABLE
NONSELECTIVE

*UREABOR is a trade-mark of Borax Consolidated, Limited

Easy to apply!
Just a man and
a pail is all you need!

You get Full Season's Control from One Application!

You'll rid any area of unsightly and fire-hazardous weeds with less effort—less cost—by applying new easy-to-use UREABOR Weed Killer. Only one easy dry application per year can end your weed problems for the season! Yes, UREABOR maintains its activity in the root zone for long periods—destroying existing growth and preventing regrowth. Control may continue for a year, or longer.

FOR DRY APPLICATION—BY HAND OR MECHANICALLY

Because of its granular form, UREABOR Weed Killer is easily broadcast by hand yet works well with all types of mechanical spreaders. And you'll appreciate the low rates of only 1 to 2 lbs. per 100 square feet. However, the fact that there is nothing to mix; no water to haul and, therefore, no costly, heavy equipment to supply, is a most attractive feature. Remember that UREABOR is always ready to use—DRY!

Write for Further Information

PACIFIC COAST BORAX CO.

DIVISION OF BORAX CONSOLIDATED, LIMITED

630 SHATTO PLACE • LOS ANGELES 5, CALIFORNIA

DISTRIBUTORS AND DEALERS IN ALL PRINCIPAL CITIES

STUBBORN

What better word to describe Bethlehem's 811 Rail Brace? For once this sturdy device is installed (an easy matter) it really stays put. Won't loosen, slip, or pop out of place.

The brace itself is solidly welded to the switch plate. Forced between the brace and rail web is a burly forged wedge together with an angular spring-steel piece capable of withstanding a compressive force of 20,000 lb. The spring compression alone practically prevents slippage, but when the pawls on the bracing part are turned down into slots in the wedge, the 811 is on the job for keeps.

Adjustment is easy at any time: just disengage the pawls, move the wedge to the desired new position, then lower the pawls into the appropriate slots. Spacing of the slots allows wedge adjustment in increments of $\frac{1}{16}$ in.

The Bethlehem 811 Rail Brace has been working on the railroad a good long time, and has really been around. If you would like to inspect an 811 Rail Brace at close hand, a Bethlehem representative will be glad to arrange for a visit to an installation near you. You can reach him through the nearest Bethlehem district sales office.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM 811 RAIL BRACE

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weed control

for $30 a mile

DRAINAGE PROVIDED at

NO EXTRA COST OR EFFORT

while you maintain your track in best condition with a

KERSHAW

BALLAST REGULATOR

SCARIFIER and PLOW

"TRACK PATROL"

Recognize This Symbol of Leadership

KERSHAW

MANUFACTURING CO. INC.

MONTGOMERY ALABAMA

NEED A BIG ONE?

Here is a big Northwest 95 on a job for the Nickel Plate R. R. at Ft. Wayne, Ind. These big 95s bring you a lot of machine. Light on their feet because of positive traction on both crawlers, even while turning, they get around with the minimum of ground destruction and cross tracks easily. The big crawlers take the machine where other rigs have difficulties.

Model 95s handle long booms easily. Uniform Pressure Swing Clutches are free from the grabs and jerks of ordinary clutches. Spotting loads with greater accuracy and safety is easy and boom whip is eliminated.

A wide range of hoisting equipment takes care of any type of lifting problem and gives you a choice of one, two or three load lines with or without a live boom. The "Feather-Touch" Clutch Control assures ease of operation without resorting to delicate pumps, compressors and valves. You won't be shut down because of control failure. For a big rig, it is like all Northwests, remarkably simple in design. It's easy to take care of. Easy to make adjustments.

Whatever size machine you need you should find out about Northwest advantages. Remember, there are good reasons why one out of every three Northwests sold is a repeat order. Ask for details.

NORTHWEST ENGINEERING COMPANY
1504 Field Building
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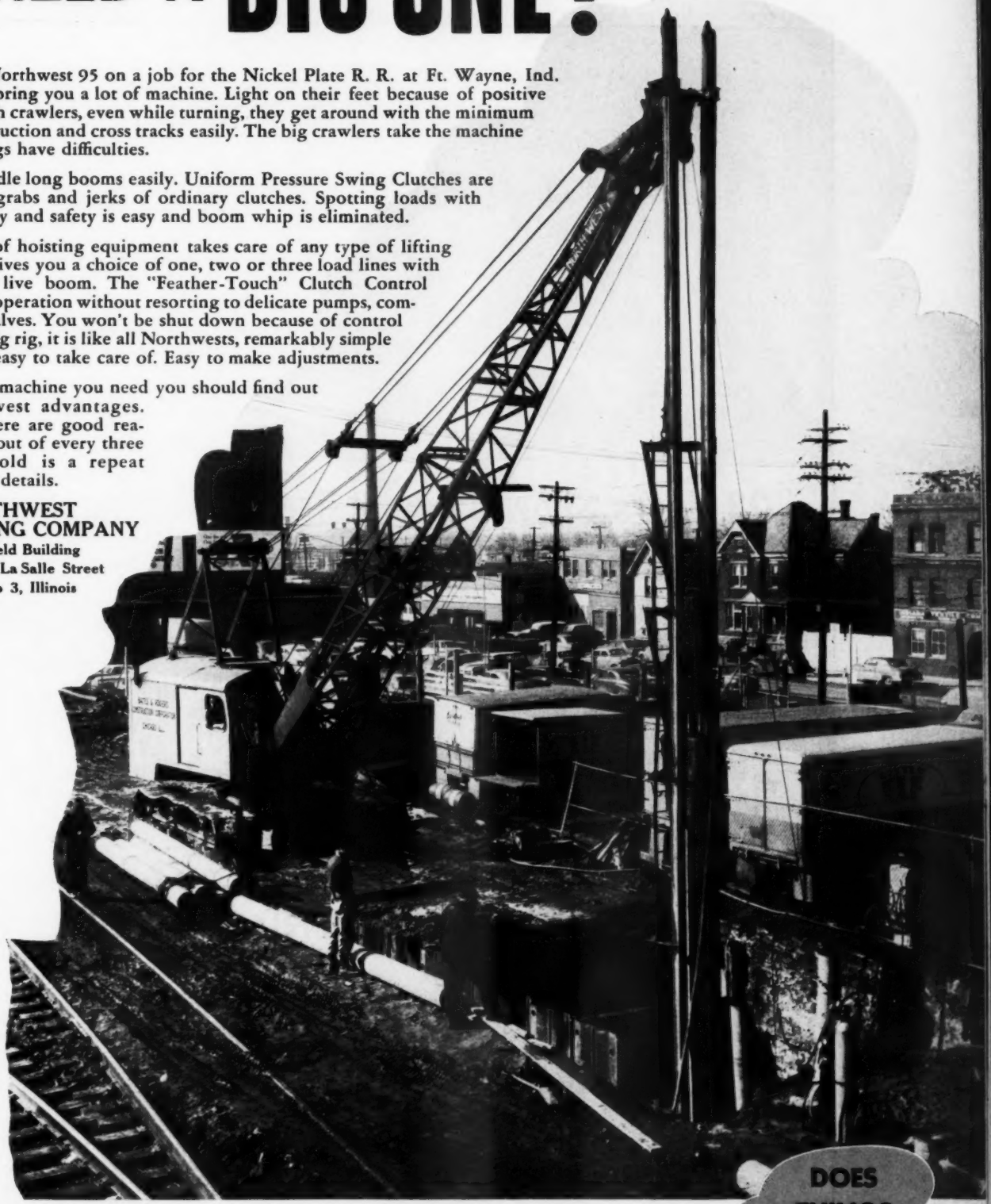
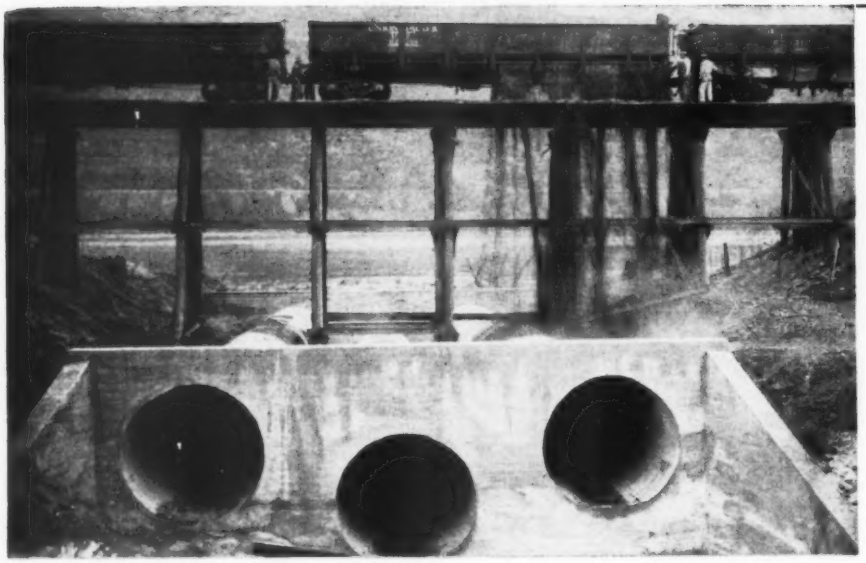


NORTHWEST

THE ALL PURPOSE RAILROAD MACHINE
CRAWLER OR RUBBER MOUNTED SHOVELS
CRANES • DRAGLINES • PULLSHOVELS



Picture taken in 1932 shows placement of fill from cars on the trestle. The three lines of Armco MULTI-PLATE Pipe are each 120 inches in diameter.

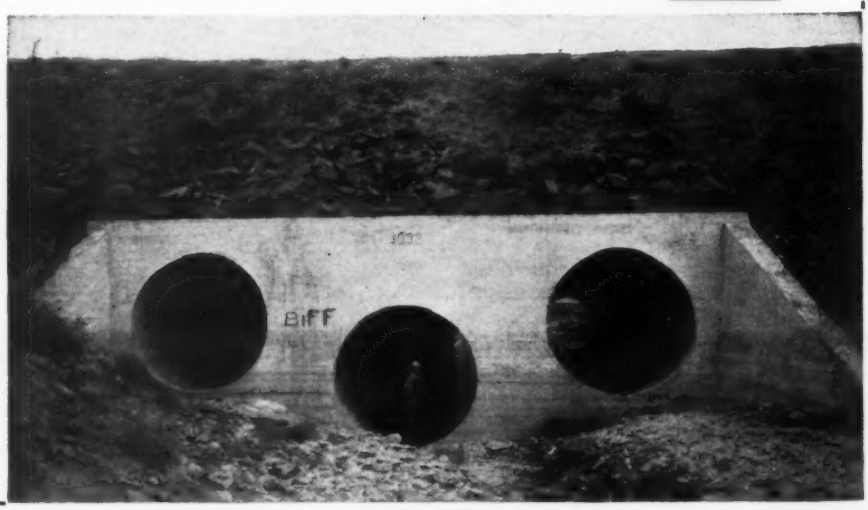
23 Years Show Value of Trestle Replacement with Armco MULTI-PLATE

Three lines of Armco MULTI-PLATE Pipe replaced a Union Pacific trestle near Walker, Washington, in 1932. They eliminated the continuing maintenance of the old structure and provided all the advantages of laying the track on solid ground. Fire was no longer a hazard.

A recent inspection showed the MULTI-PLATE to be in good condition, with every indication of many more years of useful service.

Bridging streams and ravines with Armco Drainage Structures is economical and efficient. Not only do you save maintenance but corrugated metal design assures adequate strength for dead weight under high fills or impact and vibration of heavy traffic. What's more, there is no danger of obsolescence. Armco Structures can always be extended or moved to a new location without loss of materials. There is a size, type, gage and shape for practically every drainage need. Write us for complete data. Armco Drainage & Metal Products, Inc., 5305 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation. In Canada: write Guelph, Ontario. Export: The Armco International Corporation.

ARMCO DRAINAGE STRUCTURES



Recent picture shows the structure as it is today — continuing to provide dependable service, minus the maintenance expense of the old trestle.

Excavator - Crane - Bulldozer Combination Speeds Railroad Construction and Maintenance

tractor-mounted

HYSTAWAY®

works on or off tracks

Many railroads are combatting the high cost of maintenance and construction with a unit that requires no train crew or locomotive while on the job. Completely self-contained, this outfit consists of a Hystaway mounted on a Caterpillar-diesel Tractor equipped with *ESCO* track-walking shoes and a bulldozer blade.

Able to get on or off the track easily—the Hystaway makes right-of-way maintenance work a one-machine operation. Unloading and loading rail, laying rail, handling ballast material, grading, filling and ditching are a few examples of Hystaway versatility. Rails placed in position by Hystaway do not require spiking or joint bars before Hystaway moves ahead to pick up the next rail.

Hystaway has "no tail swing" so it can work up against cars, in tunnels and other places where conventional excavator cranes can't operate.

You can mount a Hystaway on a *new* or *used* Caterpillar-diesel tractor *fast* without special equipment or tractor alterations.

Ask your Caterpillar-Hyster Dealer for details, or write to: HYSTER COMPANY, 2902-56 N. E. Clackamas Street, Portland 8, Oregon, or 1802-56 N. Adams Street, Peoria 1, Illinois.

HYSTER COMPANY

"Matched Design" Tractor Equipment for All Industries

U.S. Steel bolted heat-treated crossing, after one year's heavy-duty service.

IN JUST ONE YEAR...

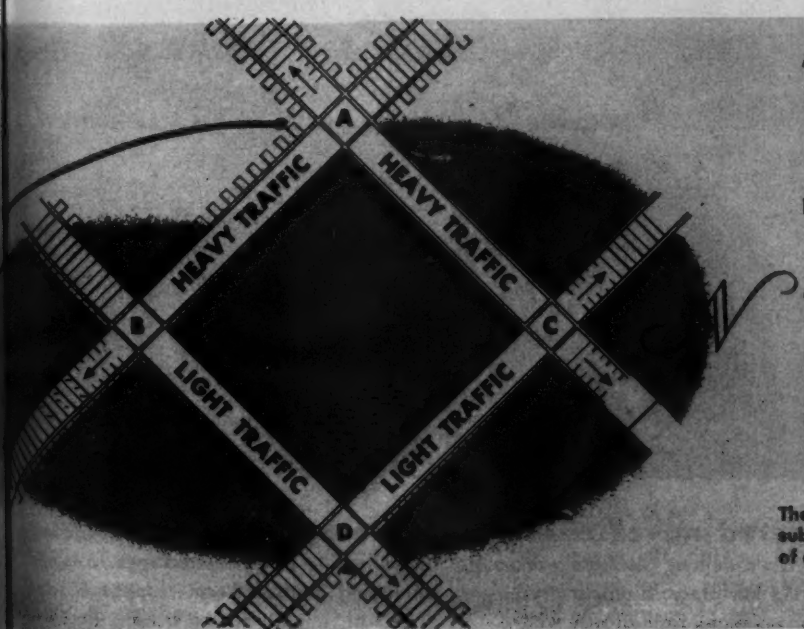
USS Heat-treated Crossing proves superiority over other crossings

THESE four crossings were installed at a major eastern railroad crossing in the Spring of 1953. Of the four, one was a U.S. Steel heat-treated bolted crossing and the others were of a competitive type and manufacture.

After one year of service, the crossings were carefully examined for wear. The USS heat-treated crossing—although it had been subjected to the heaviest traffic conditions (see diagram)—showed less wear than the other crossings.

The full heat treatment of rails, pioneered by U.S. Steel, not only increases their hardness and resistance to wear; it increases their strength, toughness, and resistance to impact. Moreover, these properties are imparted not only to the surface of the rail head, but to the entire rail including the web and the base. Such superior qualities provide longer life for trackwork, resulting in considerable savings to the railroad using the product.

For further information, write to United States Steel Corporation, 525 William Penn Place, Room 4713, Pittsburgh 30, Pennsylvania.



A. USS Heat-treated Crossing

1. South to North Traffic. Loaded coal trains. 35 MPH freights heavy in summer, light in winter, plus one local freight daily.
2. East to West and West to East. Two 70 MPH passenger and four 50 MPH freights daily. One local freight. (High speed traffic causes as much or more wear than heavy tonnage.)

B. Competitive Type Crossing

1. South to North Traffic. Same as crossing "A"-1, above.
2. East to West Traffic. Very light (siding traffic only).

C. Competitive Type Crossing

1. North to South traffic. Empty coal trains and one local freight daily.
2. East to West and West to East traffic. Same as crossing "A"-2, above.

D. Competitive Type Crossing

1. North to South traffic. Same as crossing "C"-1, above.
2. East to West traffic. Same as crossing "B"-2, above.

The combination of heavy freight and high-speed passenger trains subjects the USS heat-treated bolted crossing to the heaviest traffic of all described above.

USS

TRACKWORK

S STEEL

Cutting berm ditch along main-line right-of-way near Chillicothe, Illinois, D Tournapull self-loads root-laced clay . . . heaps up to 5 cu. yds. in less than a minute. With speeds to 28 m.p.h., the one "D" and its one operator completed this ditching job fast, and at a much lower cost than with former methods. "D" eliminated need for a work train and crew.

At approach of traffic "D" drives up on bank. As soon as the line is clear, rig will go back to work. No time is lost deadheading work trains to nearest siding . . . through-traffic is not delayed. Multi-disc 4-wheel air brakes hold rig safely on steep side slope.

Self-powered moves at speeds to 28 m.p.h. save delays, get more work done. With big low-pressure rubber tires, Tournapull drives along right-of-way without damage to ties or tracks. Simplifies dispatching . . . saves time of loading and unloading . . . goes right to work.

At stockpile, "D" uses its bulldozer blade to side-cast screened rock to level a loading course. Electric-control blade gives fast, smooth dozing action. Rig has plenty of power (122 h.p.) and maneuverability (90° turns in 12′ 9″ radius) to speed dozing.

LeTourneau-Westinghouse Company PEORIA, ILLINOIS

HOW

Your railroad can cut costs with TOURNAPULLS

Sloping 4-to-1 bank, "D" dozes topsoil from hillside cut. Other jobs . . . *repairing washouts . . . stockpiling coal . . . clearing slides . . . plowing snow . . . clearing right-of-way.* Write for job-proved data on your type of work . . . or, see your LeTourneau Distributor.

Spreading ballast, "D" distributes even layers from 1" to 10" deep . . . can also pile entire load in one spot. Here, operator will later level ballast by lowering bulldozer blade to "float" on the rails and act as depth shoe. 8' 1" blade easily covers gauge of tracks.

Self-loading ballast, Tournapull gets about 4 ½ cu. yds. of 1 ½" rock per load. Power-proportioning differential, which applies 4 times the power to wheel on firmest footing, keeps "D" pulling through loose, soft, or slippery material . . . reduces downtime for weather.

Turning 90° in radius of 12' 9", "D" moves into position for spreading. Rig crosses tracks without blocking . . . does no damage to rails, switches, etc. Big 18.00 x 25 tires deflect load evenly over obstructions . . . do not chamfer ties, trip or damage block signals.

Loading from hopper, Tournapull's square top opening speeds handling. Wash water drains freely from bottom of scraper . . . eliminates hauling unnecessary weight. Rig also can be loaded by shovel or dragline . . . speeds both long and short haul operations.

Tournapull—Trademark Reg. U.S. Pat. Off.
Tournatractor—Trademark DP-155-RR

Send now to: **LeTOURNEAU-WESTINGHOUSE CO., *Peoria, Illinois***

Name_____ Title_____

Company_____

☐ Please tell us more about 9-ton, 122 h.p. D Tournapull. ☐ Also send data on 19 m.p.h., 186 h.p. rubber-tired Tournatractor.

Street_____ City_____ State_____

DP-155-RR

NEWS

MON-O-COACH trailers meet your off-track housing of maintenance

HERE you have a new and exceptionally good solution to a present or future problem — *mobile* housing of maintenance-of-way forces.

Up to now, the general practice has been to use converted railroad cars for such housing. Occasionally converted house trailers have been used.

Now Mon-O-Coach makes available its all-aluminum trailer in *exclusive* monocoque construction. It is designed specifically for off-track housing and already proven preferable for this purpose in actual use. In addition to considerable cost savings, there are many important advantages to using all-aluminum off-track trailers as designed and built by Mon-O-Coach, Inc.

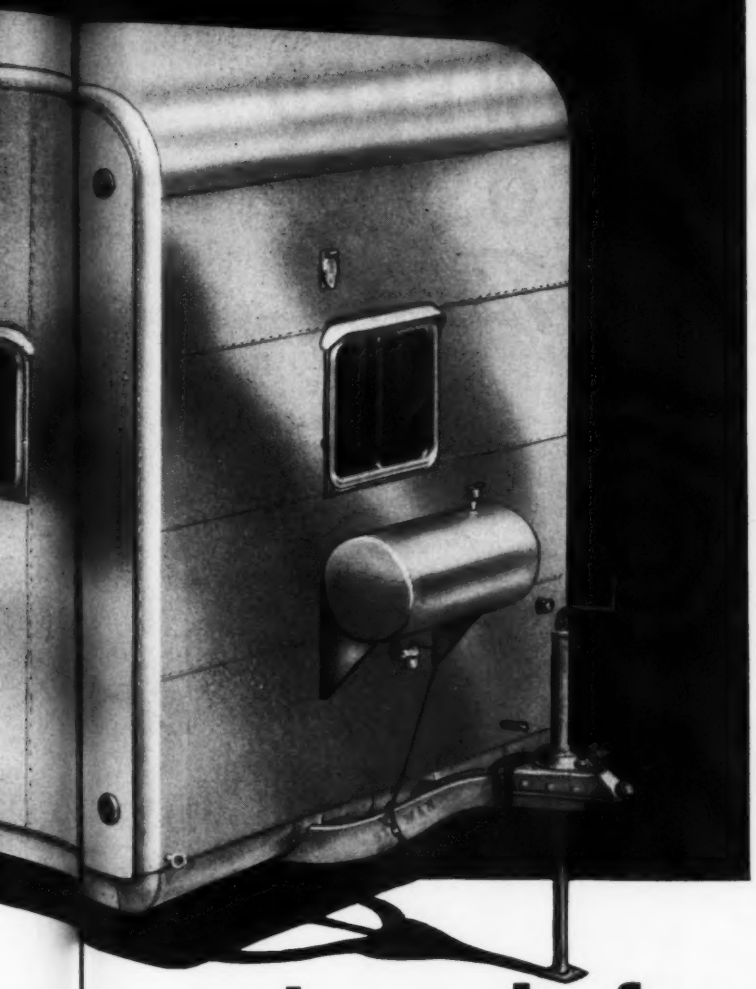
Maneuverability Gained. The type of trailer offered by Mon-O-Coach is perfect for maneuverability. It can be moved easily — by car, light truck or jeep. It conforms to highway travel requirements. It can be parked in relatively small areas. It may be located for short or long periods, as needs require.

Obviously, trailers require no track equipment or extra sidings. These costs are entirely eliminated. Nor do trailers require long, costly hauls from on-track housing to work sites, where sidings are not nearby.

The use of trailers for bridge-and-building forces, carpenters, welders, and the like are natural. For example, it has been found that a welding crew can be furnished with a trailer, a truck and all equipment required for far less than the cost of converting a car for only housing this crew.

Mon-O-Coach represented by:
J. B. Akers, Jr., Washington, D. C.
Harold L. Emerson, St. Louis, Missouri
Ralph A. Corley, Jr., New York, New York
Robert J. Wylie, St. Paul, Minnesota
Russell E. Long, Chicago, Illinois
Caesar Baldassari, San Francisco, California

Mon-O-



exact needs for forces

One leading railroad has also found that most all maintenance-of-way forces, including steel gangs, can be housed better, more economically and more efficiently in trailers.

How Exact Needs are Satisfied. Mon-O-Coach off-track trailers are currently built in six models—6-man, 4-man, 2-man, foreman and 2-man, dining and kitchen trailers. You can combine these — and possibly others — into whatever complements serve your specific purposes. Interior arrangements may be as presently designed, or altered to suit your specifications — without high conversion costs.

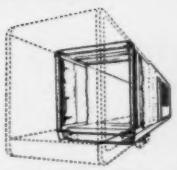
Mon-O-Coach experience in building hundreds of off-track units, and Mon-O-Coach's specialized engineering assistance may be just what you've been waiting for. Investigate now.

Mon-O-Coach, INC.

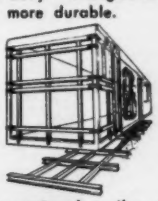
Monocoque construction for 'lifetime' durability in all-aluminum Mon-O-Coach trailers

PERHAPS the biggest reason *Mon-O-Coach* off-track mobile housing units have captured the interest of railroads is their exclusive, exceptionally durable, *all-aluminum* monocoque type of construction.

Monocoque construction produces a unit that is completely integrated — with all structural members, including the side and top panels, bearing the load, pull and shock stresses. This differs substantially from the conventional "box-on-chassis" type of construction — with weakness bound to develop where bolts and nails are used to hold the body to the chassis.



Monocoque construction produces an integrated, one-unit body — stronger, safer, far more durable.



Conventional trailer construction is essentially a box-on-chassis.

Withstands Rugged Service

In the Mon-O-Coach, stresses, jolts and jars are dispersed throughout the entire body and side panels. No one point takes the brunt of these stresses. There's no "shock line" that eventually weakens to the point of trailer uselessness.

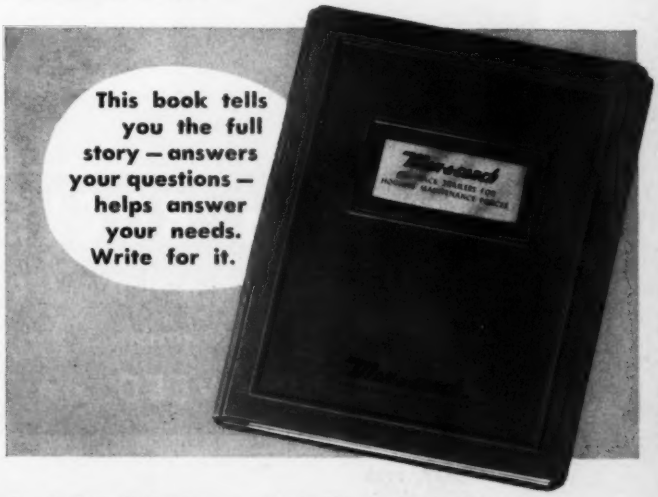
Severe tests of monocoque construction prove its exceptional durability. It is estimated that a monocoque-design trailer will outlast a conventional trailer by at least four times.

Exclusively Mon-O-Coach

Only Mon-O-Coach offers this monocoque-built trailer. Design extrusions are made from dies developed and owned by Mon-O-Coach, Inc. And only Mon-O-Coach has the experience and facilities to build this proved, more durable trailer.

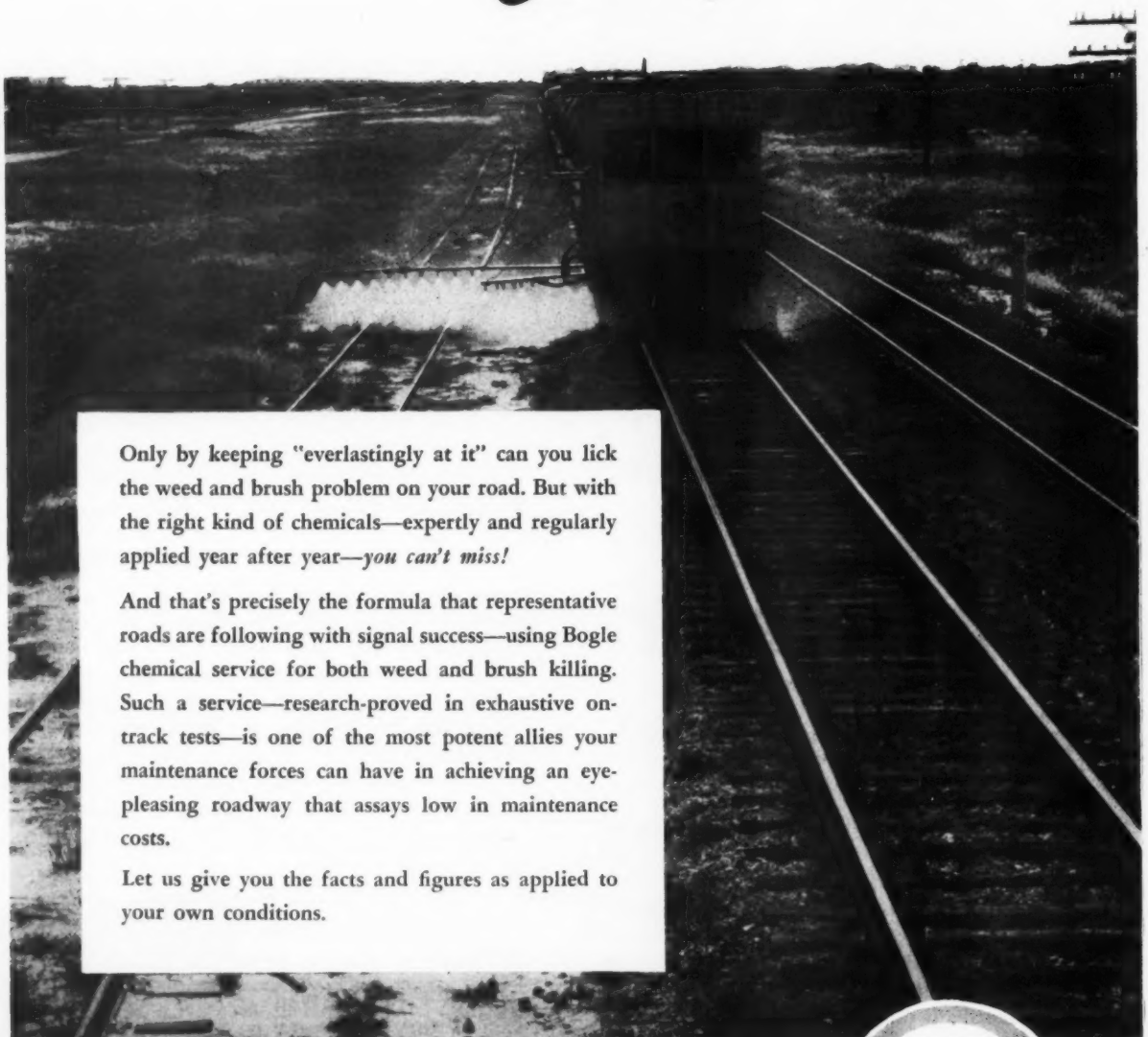
Being all aluminum, the exterior requires very little maintenance. The Mon-O-Coach also resists rust and corrosion. The aluminum interior is also easy to keep clean.

The complete facts about Mon-O-Coach off-track trailers are available to you without obligation. Simply write, on your letterhead, for 48-page book, "Off-Track Trailers for Housing Maintenance Forces."



2515 South Fourth Street • Louisville 8, Kentucky
Charles H. Becker, President • Phone Calhoun 5485

IT PAYS OFF IN LOWERED MAINTENANCE COSTS *Every Time*



Only by keeping "everlastingly at it" can you lick the weed and brush problem on your road. But with the right kind of chemicals—expertly and regularly applied year after year—*you can't miss!*

And that's precisely the formula that representative roads are following with signal success—using Bogle chemical service for both weed and brush killing. Such a service—research-proved in exhaustive on-track tests—is one of the most potent allies your maintenance forces can have in achieving an eye-pleasing roadway that assays low in maintenance costs.

Let us give you the facts and figures as applied to your own conditions.

The R. H. BOGLE Company

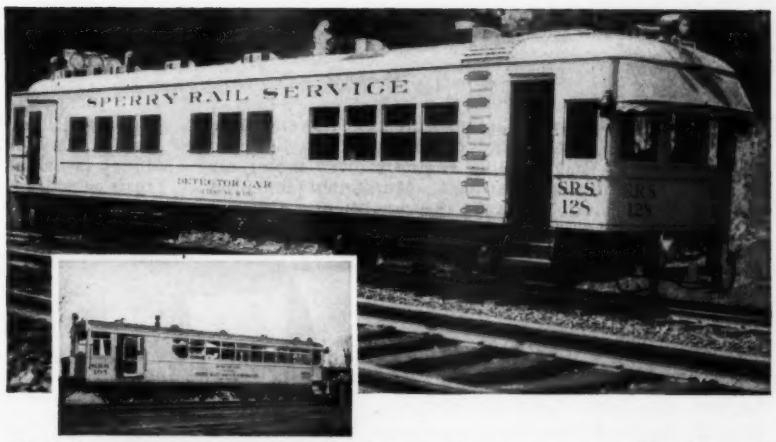
ALEXANDRIA, VA.

Memphis Tenn.

COMPLETE WEED and BRUSH KILLING SERVICE

ERIE

IMPROVES TRACK SAFETY CONSISTENTLY SINCE 1929 with SPERRY RAIL SERVICE



"It took us three days to cover the first 22 miles due to various difficulties with the early equipment," Mr. Blowers recalls. "However, Sperry's capable crew made repairs in the field and kept the inspection going with excellent results. Of the rails they thought contained hidden defects, a very high percentage proved defective on breaking." Constant development over the years has resulted in a modern fleet of 17 cars whose performance is unbelievably superior to the Detector Car (inset) which first served the Erie.

"I was Division Engineer back in 1929 when we scheduled our first test with Sperry Rail Service," states Mr. B. Blowers, Chief Engineer, Erie Railroad Company. "The Detector Car we used was, I believe, one of the first developed, and I rode with its crew almost continuously for ten days."

"We want to find defects in our rails before they reach the danger state," Mr. Blowers continues. "And Sperry's testing effectiveness is shown by the fact that, during our 1954 Spring testing, 87% of the defects found were small size (under 20%); and, during our Fall testing, 84% were small. This is valuable protection against accidents and delays to our heavy, high-speed trains."

To give safer, faster service at lower cost, the Erie is constantly modernizing with remote control interlocking, CTC, mechanized track equipment, and many other improvements. Mr. Blowers adds, "Sperry testing is part of this program. At present, we test main line tracks in both Spring and Fall; the balance of our more important branch lines are tested once each year. Close cooperation between Sperry crews and our division operating personnel cuts the time loss to a minimum during Detector Car movement."

Sperry Rail Service will continue to meet rail inspection requirements with the most advanced equipment our research and engineering can provide. Our trained personnel serve you with the skill only long experience can assure. For information on any nondestructive testing application you may have, call or write us today.

Sperry

FIRST IN RAIL TESTING

SPERRY RAIL SERVICE

Division of Sperry Products, Inc.
Danbury, Conn.
New York Chicago St. Louis

FAIRBANKS-MORSE

Maintenance and Inspection Cars

Rail cars

In all Fairbanks-Morse railroad equipment the emphasis is on safety—efficiency—and durability. In addition to having built the first gasoline engine railway motor car over half a century ago, Fairbanks-Morse has pioneered the major contributions toward the construction of safer, more efficient motor cars, push cars, and trailers. The Fairbanks-Morse equipment available to the railroads today is backed by extensive research, exhaustive track tests which have resulted in absolutely sound and practical designs that are far in advance of their fields.

model 101

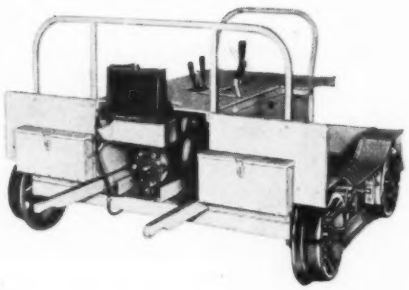
All new inspection car, has more safety features that make for more efficiency. With its simple friction drive transmission—four speeds forward, three speeds *immediate* reverse—it's a pleasure to operate. Low center of gravity helps it hug the rails for safer travel. Rear lifting weight of only 98 pounds makes it light enough to be handled by a minimum crew—yet it has ample accommodations for four men. It is the ideal inspection car for division engineers, road masters, signal maintainers, and supervisors of track.

features

Aluminum alloy frame—16"x ¼" AREA Std. demountable steel wheels with wheel silencer—spring-mounted axle boxes—water-cooled engine with steam condenser—AREA Std. safety rails—two-way extension lifting handle, spring loaded for safety—differential front axle—aluminum alloy rail skids—four-wheel brakes—fuel strainer—Linkert adjustable carburetor—flexible fuel line.

model 100

Here is a lightweight aluminum alloy frame car with a 36" wheel base that assures comfortable riding for Signal Maintainers, Roadmasters, Track Patrolmen and Linemen. There's ample room for two men and tools, yet low rear lifting weight assures easy handling by one man. Grouped controls, sure brakes mean convenient operation. Available with modern full-vision aluminum cab.

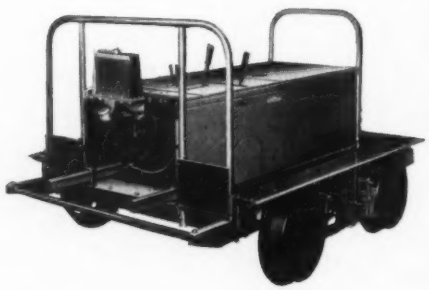


features

Aluminum alloy frame—big, 11-hp. 2-cycle engine—cast aluminum piston with 4-ring design that requires no dowels—drop-forged heat-treated aluminum alloy connecting rod with renewable bearing sleeves—differential front axle is exclusive Fairbanks-Morse double-sleeve type where each element gets half the normal wear—AREA standard demountable hub steel wheels—four-wheel brakes—flexible fuel line with strainer.

model 53D & 53DV

A double-duty motor car with seating capacity for standard section crew and their equipment—yet light enough for minimum crew to handle, with a rear lifting weight of only 154 lbs. Low center of gravity assures easier handling of fully loaded trailers and safer riding, safer handling at maximum speed. Many other models available for heavy-duty inspection and general service.



features

Powerful 8 or 13 hp., 2-cycle water-cooled engine with air-cooled clutch—pressed steel channel frame—16" x ¼" AREA Std. demountable hub steel wheels—differential front axle—optional V-belt or roller chain drive—self-centering four wheel-brakes—steel rail skids—one-piece metal seat side enclosure—two-way, steel reinforced extension lifting handles—flexible fuel line with strainer—Linkert carburetor.

FAIRBANKS-MORSE

a name worth remembering when you want the best

RAIL CARS AND RAILROAD EQUIPMENT • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • PUMPS • SCALES • WATER SERVICE EQUIPMENT • MAGNETOS

Getting ready for a day's work, the Holan Earth Borer is lowered into position for digging. Easy disengagement of the borer permits the 6500 lb. capacity hydraulic derrick to go into action for pole setting. The entire unit, Model 7000 C-102, you'll find...

Line construction bodies for light to heavy-duty. Crew compartments optional. Efficient tool compartments and drawers.

Service bodies for chassis up to 1½ ton. Lengths, 72", 84" and 102".

Hydraulic Derricks designed for front or rear mounting. Capacities to 12,000 lbs.

Ladders to 40' with all phases completely hydraulic. Pump actuated by P.T.O. or separate engine drive with electric starter. Available with "platform controls".

WORKS AN HONEST DAY FOR LESS PAY!

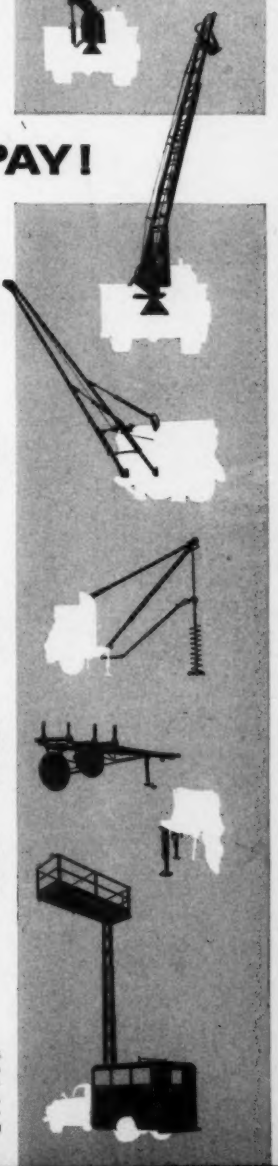
Watch the pay-dirt fly when this rugged helper fixes its hydraulic jacks and goes to work digging holes for you! It's all in a day's work for this four-in-one . . . saving you digging, pole-setting, and lifting dollars.

Utilities with tight budgets will undoubtedly want complete price information on this Thrift Line "7000" line construction body . . . with or without the power equipment. You can specify your own partitioning of compartments . . . even save more by ordering compartment inserts "knocked down."

This is the body typical of the quality manufacturing at low cost now available to customers everywhere . . . especially those in the South and Southwest . . . through Holan's new subsidiary in Griffin, Georgia.

Now, at last, regardless of your limitations, one of the Holan plants can supply bodies and equipment at your own private price range without sacrificing the quality for which the name is famous. Write the new Thrift Line plant for more information.

At the end of a day's work (or between jobs) the jack-of-all-trades hydraulically "collapses" into a compact unit for safe and easy transporting. When your pole-setting crew returns home with this eager beaver they'll all agree they'd have to search a long time to find a better working partner!



Mechanical Ladders expertly engineered and counterbalanced for effortless handling. Maximum heights from 24' to 32'. Swings 360°; angles to 72°.

Light-duty power operated derricks for front or rear mounting. Operating range of 146°.

Portable mechanical and hydraulic earth borers with optional rotation.

Wide variety of pole and reel trailers. Standard and special. Many optional features.

Hydraulic jacks, controlled from rear of truck. Rigid mounted or patented Holan self-stowing types.

Hydraulic towers with rotary, stationary, or transverse platforms. Exclusive box-girder telescoping mast.

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WHERE WORK SIMPLIFICATION EQUIPMENT COSTS LESS

News Notes

. . . a resumé of current events throughout the railroad world

RAILWAY

TRACK and STRUCTURES

MAY, 1955

The New York Central and the New Haven have both announced orders for "revolutionary low-center-of-gravity passenger trains weighing and costing about a third as much as present so-called lightweight equipment." The NYC has ordered one complete train, while the New Haven order is for two trains.

•

The Pennsylvania has announced the order of a completely new passenger train of tubular design incorporating a body structure in which the roof, floor and side walls constitute a sturdy, car-length tube of steel. Consisting of seven passenger coaches with a center of gravity only 42 in above the rail, the train will accommodate 574 passengers and will cost about $1 million.

•

The Interstate Commerce Commission has dismissed the government's reparations claims against the railroads for alleged overcharges during World War II. Estimates of the total amount of money involved ranged, through the course of the proceedings, as high as $3 billion, with the figure of $2 billion being most frequently quoted. However, during oral argument of the case before the commission, a Department of Justice attorney trimmed the government estimate of the amount involved to $475 million. Whether to appeal the Commission's decision was not immediately decided.

•

A contract for a study of a new nuclear-powered reciprocating engine for locomotive propulsion has been signed in Washington, D. C. In cooperation with the Atomic Energy Commission the Baldwin-Lima-Hamilton Corporation and the Denver & Rio Grande Western, parties to the contract, will investigate engineering, technical and economic aspects of building and operating a nuclear-powered locomotive. The study is scheduled to run for one year at the end of which time a report will be made to the AEC with recommendations for future work.

•

New streamlined air-conditioned coaches of double-deck design are currently being placed in service on Chicago & North Western's suburban trains at Chicago. The cars, built by the St. Louis Car Company, are being delivered at the rate of one a week. A total of 16 of the gallery coaches, with a capacity for 169 persons each, are included in this order.

•

As this issue went to press, the strike against the Louisville & Nashville, the Nashville, Chattanooga & St. Louis, and affiliated roads, was entering into its eighth week with no indication that a settlement would be effected within the near future. L&N President John E. Tilford was meeting with the governors of the 13 affected states as this was written in an effort to establish a basis for arbitration. The strike, which has forced cancellation of all passenger service on the affected roads and severely curtailed freight operations, has also hit hard at industries located along the roads' lines—notably the Kentucky coal fields. The strike involves a dispute over the company's health and welfare policy which provides coverage to employees at a cost of $1.85 per month per employee, as compared with $3.40 for the unions' national fund plan. The L&N has filed suit against the non-operating unions and operating groups observing the "non-ops' " picket lines. Violence has flared at several points with 4 derailments to date, burnings and attempted demolition of bridges, severance of communications lines and bombings of homes of non-striking employees.

Nalco Spray Cars give precise dosage and coverage. Available without charge to users of tank car lots of Nalco Chemicals.

10 POSITIVE *Nalco* WAYS

for ALL-SEASON WEED and BRUSH CONTROL

● Whatever your particular weed, grass or brush control problem — Nalco has the safe, sure answer in this complete selection of proved chemical treatments . . . *10 in all.*

Nalco also assures the most *economical* application possible . . . with mechanical spreaders and shaker boxes for small and hard-to-reach areas . . . with various sized drums, and tank car lots for use in modern Nalco Spray Cars.

Right now is the time to start your full-season weed control program with Nalco Chemicals. Ask for full facts on scheduling and prices.

	CHEMICAL	DOSAGE	APPLICATION	SHIPPED
1	Nalco H-170 Weed Control	One gal. per 1000 sq. ft.	After predominant weeds emerge.	Tank cars and 54 gal. drums.
2	Nalco H-170B Weed and Grass Control	One gallon per 4500 sq. ft. with one gal. H-170 per 1500 sq. ft.	After predominant grasses emerge. Use in combination with Nalco H-170.	Tank cars.
3	Nalco H-174 Weed and Grass Control	200 to 400 lbs. per acre.	Best applied in early spring or just before rainy season.	100 lb. drums and 5½ lb. shaker boxes.
4	Nalco H-175 Dormant Brush Control	Dilute 10 gal. with 90 gal. diesel oil, etc. Use 25 to 40 gal. per acre.	Thoroughly wet basal area of plant.	54 gal. drums.
5	Nalco H-176 Brush Control	Dilute one gal. to 135 gal. of water. Use 100 to 300 gal. per acre.	Thoroughly wet brush after leaves are out.	Tank cars and 55 gal. drums.
6	Nalco Dalapon (liquid) Weed and Grass Control	Dilute 10 gal. with 90 gal. of water. Apply 100 gal. per acre.	After predominant grasses emerge. Use in combination with Nalco 2, 4-D.	Special 8000 gallon tank cars.
7	Nalco 2, 4-D Alkanolamine Weed Control	Dilute up to 3 gal. with 100 gal. dalapon solution per acre.	After predominant weeds emerge.	Tank cars and 55 gal. drums.
8	Ammate (liquid) Brush Control	Use 100-300 gal. per acre of dilute solution containing ¾ lb. per gal.	Thoroughly wet brush after leaves are out.	Tank cars.
9	Penta and Oil Weed Control	Dilute 30 gal. with 170 gal. water per acre.	After predominant weeds and grasses emerge.	Tank cars.
10	2, 4, 5-T (liquid) Brush Control	Dilute 1 gal. to 135 gal. of water. Use 100-300 gal. per acre.	Thoroughly wet brush after leaves are fully grown.	55 gal. drums.

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Huntington, West Virginia

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PRODUCTS . . . Serving the Railroads through Practical Applied Science

BUCYRUS ERIE

TRANSIT CRANES

Cost-Savers Down the Line

If you're looking for an all round crane-excavator to handle all shapes and sizes of track maintenance jobs, Bucyrus-Eries are a sure bet to help you. Because of their mobility and versatility, they get these jobs done quickly and, in many cases, at far less cost.

JOB MOVES ARE EASY

Carrier mountings, designed for travel at speeds up to 31 mph., provide full stability on any kind of working surface.

EFFICIENCY IS HIGH

No matter what the job, outstanding front end versatility makes it easy to switch from crane to clamshell, dragline, shovel or dragshovel operation with only the simplest machinery changes.

OPERATION IS FAST

Standard Transit Crane features like fully independent power boom hoist, power controlled load lowering, and direct-connected mechanical controls mean responsive operation.

See your local Bucyrus-Erie excavator distributor for full information on the 15-ton capacity 15-B Transit Crane, convertible to ½-yard excavator service, and the 25-ton 22-B Transit Crane, a ¾-yard excavator. A complete line of 3- to 60-ton crawler mounted cranes is also available. 76E54

BUCYRUS-ERIE COMPANY
South Milwaukee, Wisconsin

1931 24 CONSECUTIVE YEARS 1955
MODERN BALLAST CONDITIONING

BEFORE *"R.B.C.C." Service*

AFTER *"R.B.C.C." Service*

"R. B. C. C." ballast cleaning service has earned its outstanding performance record from 24 years of successful operation. Our 3 and 5 unit trains are entirely self contained on our own standard railroad equipment—No railroad cars are used or tied up.

"R.B.C.C." 5 unit equipment does a thorough ballast conditioning job, cleaning two center ditches or two shoulders or one of each at one trip.

"R.B.C.C." 3 unit equipment, self propelled, does a thorough ballast conditioning job, cleaning one shoulder at one pass on one side only.

"R.B.C.C." ballast cleaning or excavating service, complete with our own personnel and equipment, is handled on contract basis.

RAND TOWER
MINNEAPOLIS, MINN.

METROPOLITAN BANK BLDG.
WASHINGTON, D. C.

Burying cables, Gradall digs the trench, backfills, removes and loads out excess fill. The "arm" and "wrist" action of boom and bucket enable the operator to do a hand-finish job.

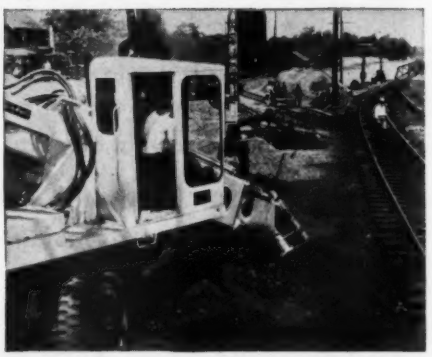
11 different jobs on track relocation ALL handled by ONE GRADALL!

On a million-dollar track relocation project, an eastern railroad's Gradall really demonstrated its money-saving versatility!

Gradall made it a "one-machine" job! The work involved building a double track over a fill to replace a single-track trestle over a swamp—plus "extra" jobs moving crossings, semaphores, etc. Trains can now maintain speeds of 45 mph through the area, eliminating the 15 mph bottleneck created by the trestle.

Look at this list of jobs—*all* handled by this one Gradall:

- Installing 800' of 24" culvert.
- Spreading ballast.
- Aligning track.
- Burying cables and removing excess fill.
- Installing semaphores—Gradall dug footer and placed signal in position after concrete was poured.
- Grading and building up roadbed.
- Loading out old ties.
- Building new crossing—clean-up preparation and spreading and rolling asphalt.
- Moving gateman's shanty to new location.
- Setting 78', 140 lb. rail.
- Dressing slopes.



Gradall clears the way for new roadbed. Note the new double-track line curving in from fill to meet old track, eliminating single-track trestle at top right.

In addition, this railroad has used Gradall for cleaning track (600' to 800' per day), replacing ballast, as an emergency unit, and for many other maintenance and construction jobs.

You, too, will find that a *single investment* in a Gradall will give you a machine that will do the work of *many* "specialized" machines, eliminate costly hand labor, and cut costs. Write us for a Gradall demonstration right on your job: *The Warner & Swasey Co., Gradall Division, Cleveland 3, Ohio.*

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PRECISION MACHINERY SINCE 1880

Gradall Distributors in over 75 principal cities in the United States and Canada

YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS WITH WARNER & SWASEY MACHINE TOOLS, TEXTILE MACHINERY, CONSTRUCTION MACHINERY

Wood structures and lumber treated with Reilly Creosote Oil have a life expectancy of as much as 50 years.

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A complete **MOBILE CAMP** for traveling railroad work-crews. Easily towed to site — can be used at or away from city utilities.

MORRISON - International CAMP CARS designed and built by railroad men who know railroad needs. Now in service on leading railroads.

AVAILABLE IN THESE STANDARD MODELS

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- 8-Man Dormitory with Lavatory and Shower
- Combination Kitchen & Dining
- Complete Kitchen Car with Living for 2
- Dining and Recreation Car Accommodates Up To 22
- Office or Tool Car with Living for 2

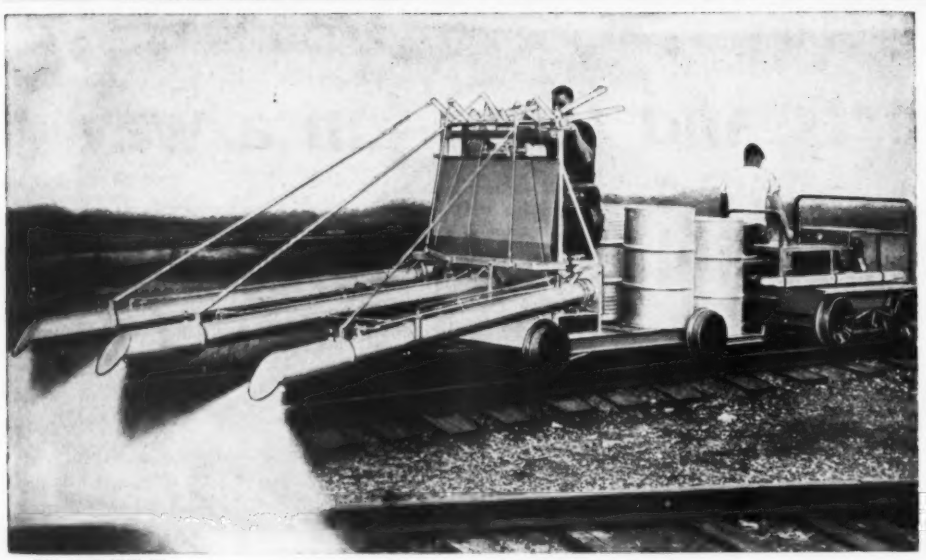
5-man model for small crews; other models in combinations to accommodate larger crews.

Product of INTERNATIONAL EQUIPMENT DIVISION

MORRISON RAILWAY SUPPLY CORP.

1437 Bailey Avenue BUFFALO, N. Y.

CUT WEED CONTROL COSTS WITH A . . . WOOLERY



Model PB-B
WOOLERY WEED BURNER trailer type (shown above) can be towed by motor car. Three burners clear a swath 15 feet wide on first trip and if required can be widened to 25 feet with burners extended on second trip.

A great many millions of dollars have been spent keeping roadbeds clear of weeds—and also for keeping retarders and switches open in the winter.

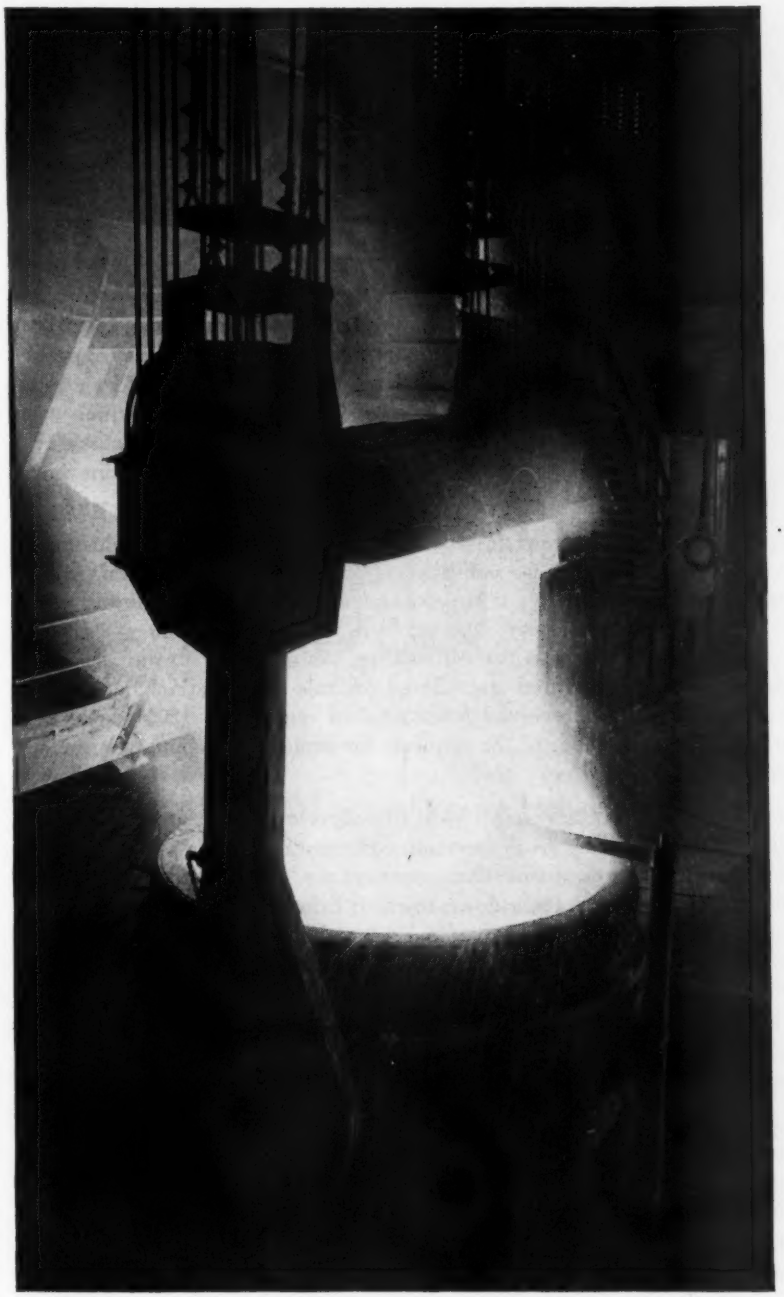
The Woolery PB-B—a versatile, flexible yard or on-the-line weed burner does these jobs *without fuss—and has been doing them for years!* A good example of what we mean: it destroys all weeds *completely* (due to individually controlled burner arms for raising and lowering as required by ground contour) in a 15-foot swath on one trip and—with burner arms extended on return trip—burns a 25-foot swath! *Yet the PB-B can be taken off track by only two men!*

Small, light, *inexpensive*—towed by a motor car, the PB-B is the ideal burner for yard work—and in many cases *better* than larger burners for on-the-line work. Can be put on the job *faster!* (Three other Woolery burners in larger sizes available.)

Send for folder #170

WOOLERY MACHINE CO. 2919 Como Ave. S. E., Minneapolis 14, Minn.

Our own nickel-rich alloy steel, made in our own plant, makes TIMKEN® bearings tougher



NICKEL makes steel tougher. So, our steel-making specialists don't skimp on nickel in the fine alloy steel we make for Timken® tapered roller bearings. They use exactly the right amount of nickel to give these bearings the toughness they need to withstand shock and last longer. Exacting quantities of chromium or molybdenum or both guarantee uniform hardness. By using the steel industry's first direct-reading spectrometer, we exercise hairline control of each element at the precise instant of tapping the furnace.

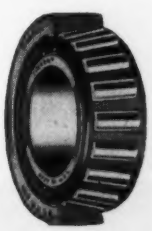
Rolling, annealing, and cooling are done with the same meticulous care. And every race and roller that goes into a Timken bearing is precision case-carburized to give it a hard, wear-resistant surface over a tough, shock-resistant core.

We've been specializing in the production of fine alloy steel for almost forty years. We're the only bearing manufacturer in the country that makes its own steel, because it's the only way we can make sure the quality of our bearing steel is just the way we want it. Steel is the heart of the bearing. That's why we insist on controlling bearing quality *every* step of the way—from melt shop to final bearing inspection. And that's why we don't skimp on the use of nickel.

To be absolutely sure of the highest performance standards in the equipment you build or buy, always specify Timken tapered roller bearings. They are made from seamless tubing or forgings by the most modern processes, under strict control. Only Timken bearings roll so true, have such quality thru-and-thru. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.

Only TIMKEN® bearings roll so true, have such quality thru-and-thru



RAILWAY

TRACK and STRUCTURES

Subject:

Dear Readers:

The Foreman Speaks

Lately we have had reason to do more than the usual amount of thinking about section foremen and their importance in the track-maintenance picture. There isn't any doubt that these are key men in their field and that the attitude they have toward their work is a matter of prime importance to higher maintenance-of-way officers.

Anyone who has personal contact with track foremen knows that, as a group, they are hard-working, loyal and conscientious employees and that they are respected members of their communities. From personal experience we can add that formen in general are eager to acquire information that will enhance their ability to do a good job. The means by which we have come to this latter conclusion are such as to indicate unmistakably that many track foremen are not only avid readers of our magazine but that they read it with a critical and appraising eye.

Let's review several recent developments that point to these conclusions. During the past year we have published two series of articles dealing with the why and how of two basic maintenance operations—track lining and track raising. Both series were written by a practical track man—Leo C. Blanchard, a roadmaster on the Milwaukee. As a service to our readers the first series was reprinted and offered for sale at a nominal figure. To date orders have been received for a total of more than 1500 copies. A surprisingly large number of the requests for copies have come from individual track foremen.

More or less simultaneously with this development the mails have brought a rash of letters from foremen, commenting on the series and on other features of the magazine. One man says we "have been doing a very good job of handing out some down-to-earth information on track work," and adds that he would like to see a book published containing the two series, as well as other articles. Another foreman suggests that we present the "What's the Answer?" department in such a manner that these pages may readily be clipped and filed for reference, and also wants us to publish pamphlets containing the best answers. However, he adds appreciatively, "Whatever you do, I am still pleased with your magazine as it is."

Still another foreman, after commenting favorably on the editorials, the News Notes and Leo Blanchard's series, said he feels "the advertising is educational," and added that he likes to read "how unusual experiences are handled, such as floods, fire, derailments, snow, ice and blowing sand." A fourth wants "to see more discussion from the employee's viewpoint instead of all from management."

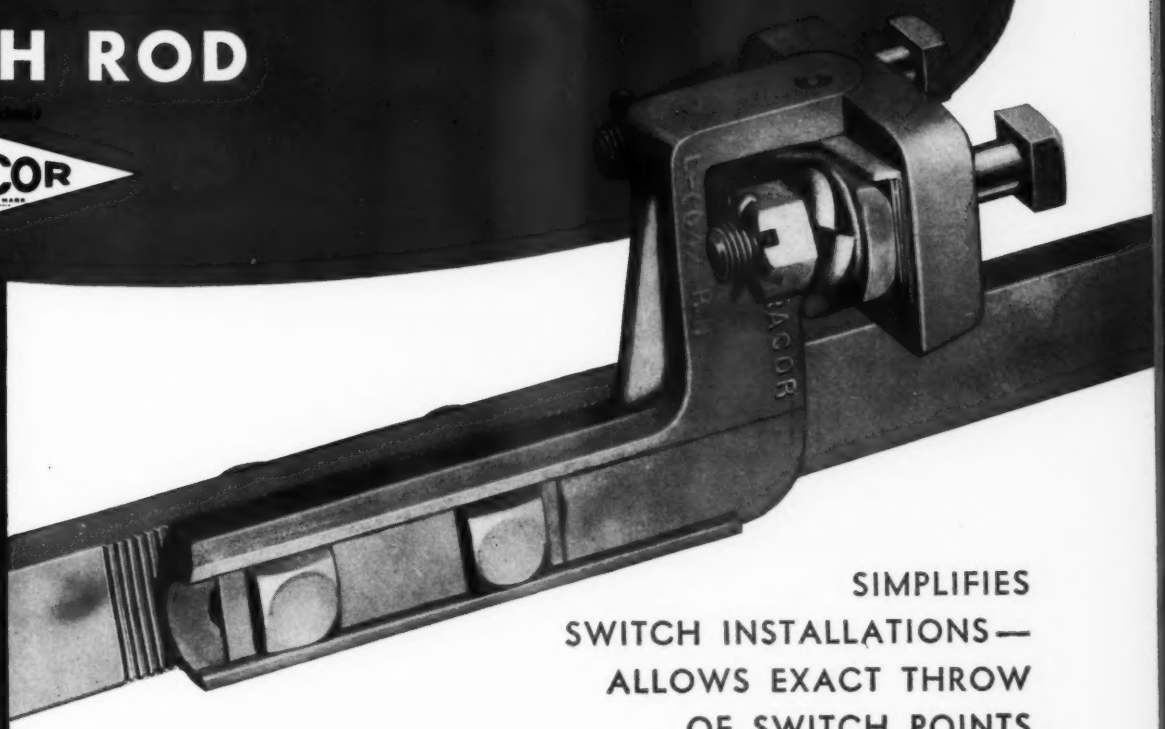
Such evidence of readership by foremen is gratifying to say the least, not only because it is a measure of the extent to which the magazine is read, but also because of the constructive suggestions offered for improving the service we endeavor to render our readers. These comments from foremen are also a reminder of our responsibility to produce a magazine that will be of interest and value to supervisory personnel of all ranks. Is there a Solomon in the house?

MHD

THE RACOR "MJ" ADJUSTABLE VERTICAL SWITCH ROD

(Patented)

RACOR
TRADE MARK



SIMPLIFIES SWITCH INSTALLATIONS— ALLOWS EXACT THROW OF SWITCH POINTS

This new Type "MJ" Switch Rod was designed to include an adjustable feature that will simplify the installation of switches so as to readily obtain an accurate throw of the switch points and maintain this throw during the life of the rod. It was patterned essentially after the popular RACOR Type "M" Vertical Rod.

Identical rods can be used in various switch designs for either head or back rods.

The "MJ" Rod is furnished with extra strong clips with elongated holes and with accurately machined serrations that correspond with those in the switch rod. It eliminates rod bolt hole wear that normally develops when non-adjustable type rods are used.

This rod is recommended for use in heavy duty hand, machine or spring operated switches.

For further information, contact your nearest RAMAPO representative.

America's most complete line of Track Specialties

RACOR SNOW BLOWERS
RACOR STUDS
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TYPE M & MJ
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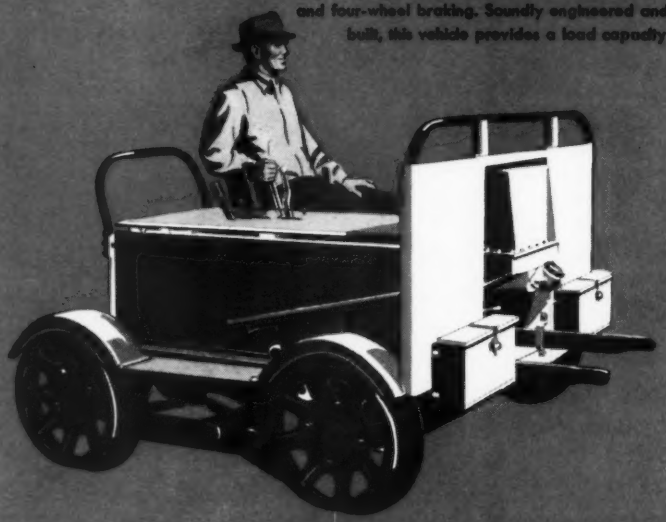
M19 SERIES @ One- to Two-Man Inspection Car features an efficient roller bearing engine, enclosed housing and adjustable lift handles. Only 540 lbs. in weight, it offers unusually high standards of performance, safety and dependability.

M19 SERIES A One- to Four-Man Inspection Car provides two-way drive, four-wheel braking, enclosed housing and a 5- to 8-horsepower engine. Unusual safety and maneuverability are among its outstanding performance characteristics.

M19 SERIES F One- to Four-Man Inspection Car employs a 5- to 8-horsepower roller bearing engine, a new engine stabilizer and four-wheel braking. Like all Fairmont products, it offers a maximum of dependability and economy of operation.

M19 SERIES AA One- to Four-Man Inspection Car offers a new two-cylinder Fairmont engine, demountable wheels and four-wheel braking. Soundly engineered and soundly built, this vehicle provides a load capacity of 750 lbs.



You'll find the answer at Fairmont

There is no more important or demanding assignment in railway maintenance than that of inspection. It is, in a sense, the task-master of the entire maintenance operation. If you are presently selecting inspection equipment it is, therefore, important that you do so with the greatest care. On this page we submit, for your consideration, a representative selection of Fairmont inspection cars—each designed for a particular need. Among them, almost certainly, is the product that answers perfectly your own requirements. The accompanying descriptions will, of course, indicate their spheres of operation—but they can in no way connote the fine design, the sound engineering or the careful craftsmanship of these Fairmont cars. We suggest, therefore, that you send for detailed information on any cars in which you are interested. We will be happy to serve you—and we have every confidence that you will find Fairmont the perfect source for your inspection equipment.

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RAILWAY

TRACK and STRUCTURES

May, 1955 **Vol. 51, No. 5**

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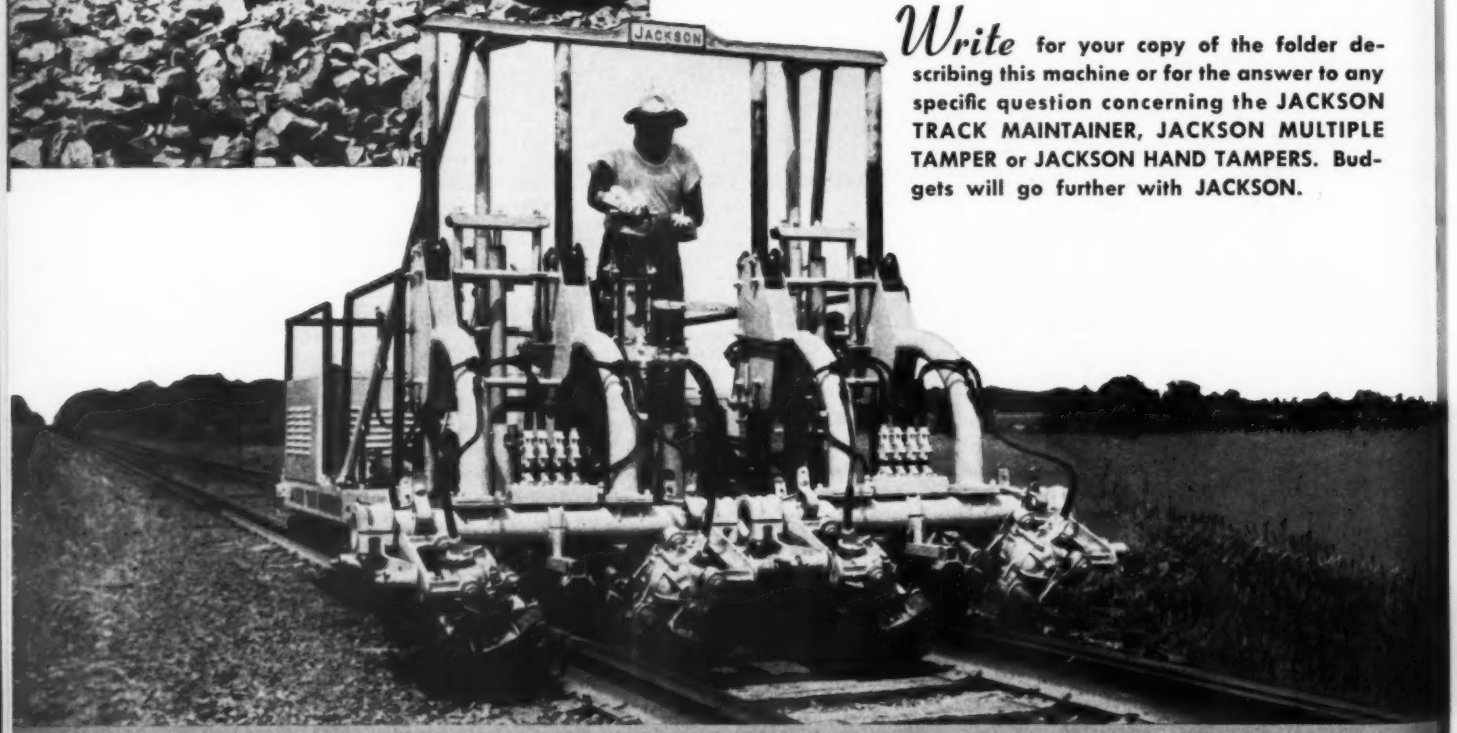

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A Straw in the Wind

The undesirable effects of cyclical fluctuations in maintenance programs, which develop from the use of the maintenance dollar to balance railroad budgets, are beginning to make an impression on top railroad management.

As evidence of a shift in thinking in this direction we cite a talk recently given by D. W. Brosnan, executive vice-president of the Southern, who spoke extemporaneously before a group of railroad and supply men in Chicago on the subject of "Modern Rail Service and Control of Cost."

In this talk, Mr. Brosnan advocated a "steady, stretched out maintenance program" involving use of a maintenance force working on a carefully regulated schedule. In expanding on this remark, he said: "In the rushes you must hire temporary help. It is always poorer, inexperienced help and it is, therefore, poor economy."

According to Mr. Brosnan's thinking, track and physical plant "cannot be under-maintained indefinitely without storing up trouble." He added that the superior products available today permit longer maintenance cycles.

"A dollar saved at the expense of physical plant can be the poorest dollar you ever laid your hands on. Fix up your plant! Fix it up right! Borrow the money if you have to. You'll earn it back surprisingly soon. This is a challenge with money in it—up to 100 per cent return a year! There isn't a railroad in business that can afford *not* to find money to modernize its plant," Mr. Brosnan stated.

These remarks are more than just thought provoking, they present a real challenge. Economy in the long pull is not just cutting corners. It is tied directly to modernization of both plant and work methods. In an industry as highly competitive as that of transportation, any improvement that reduces costs means money in the pocket.

They're Here to Stay

Beginning on the next page is a rather unusual type of article. It consists of a verbation reproduction in print of a panel discussion of 78-ft rail and continuous welded rail, which took place at the closing session of the AREA convention in March.

The discussion brought out several points of interest. One of these is that 78-ft rail, consisting of 39-ft rails welded into double lengths, has been quietly adopted more or less as standard on several roads. Because many roads are using double-length rails only at grade crossings and other special locations, the revelation that a few roads are installing them in out-of-face rail-laying work seemed to come as a surprise to many of those present.

It was evident, also, that the handling and laying of 78-ft rails present no insurmountable, or even difficult, problems. On the other hand those roads using them are convinced that they produce worth-while economies. It is apparent that, with several methods available for making satisfactory butt welds, the roads are not going to wait until rolled 78-ft rails become available before making use of double lengths on a large scale.

When the discussion got around to continuous-welded rail it soon became evident that there has also been a sudden spurt of interest in this development. There are several explanations for this increased interest. Doubtless it is partly due to the sheer weight of accumulated experience with long rails over a period of years. One aspect of this experience is that some of the early misgivings regarding what might occur with such rail under certain conditions have now been largely dispelled. The fact that a new method for butt-welding rails into long lengths has now been made available may also be partly responsible for the greater interest in them.

Hardly anyone could listen to the panel discussion without being convinced that 78-ft and continuous rails are here to stay.

AREA Panel Discussion . . .

• 78-Ft Rail

• Continuous Welded Rail

● On Thursday, March 17, an unusually large audience was present in the Grand Ballroom of Chicago's Palmer House to witness the final session of the AREA's annual three-day convention. And the crowd became even larger as the time drew near for a scheduled panel discussion of 78-ft rail and continuous welded rail.

This feature had been planned under the joint sponsorship of the association's Committee on Rail and the Special Committee on Continuous Welded Rail. The six panel members were chosen because of special qualifications to discuss particular phases of the subject, including even one representative from a road that has consistentiy avoided the use of long rails.

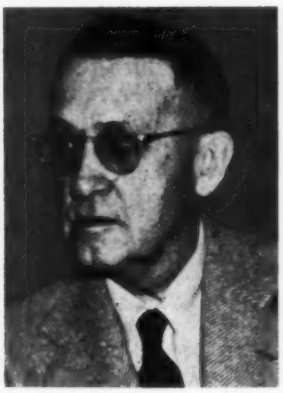
The panel discussion had been included in the program because of the growing interest in long rails and the fact that their use is showing a steady, although not spectacular, increase. This thinking was confirmed by the large attendance during the panel discussion and by the attentiveness of those present.

Because of the unusual interest shown in it, the discussion is reproduced on these pages, condensed somewhat to eliminate duplication of material and to fit the remainder to the space available.

Members of the Panel . . .

C. J. Code—Moderator
Assistant Chief Engineer—
Engineer of Tests, Pennsylvania

L. R. Lamport
Chief Engineer Maintenance
Chicago & North Western



L. T. Nuckols
Chief Engineer, Southern Region
Chesapeake & Ohio

E. J. Brown
Chief Engineer
Burlington Lines

78-Ft Rail

Code (after introducing the members of the panel): *Mr. Lamport, what is the present status of 78-ft lengths of rail?*

Lamport: At the present time, Mr. Code, the interest in 78-ft rail is increasing. Prior to 1950 there were 39.4 miles of 78-ft rail on the railroads of the United States. Since 1950, 203.4 miles have been laid, and in 1953 and 1954 this was stepped up considerably. Of that 203.4 miles, 62.2 miles were laid in 1953 and 107.5 miles were laid in 1954. Some usable rail in 72 and 74-ft lengths has also been laid, but your committee on 78-ft rail has not gone into that, because it was not part of its subject.

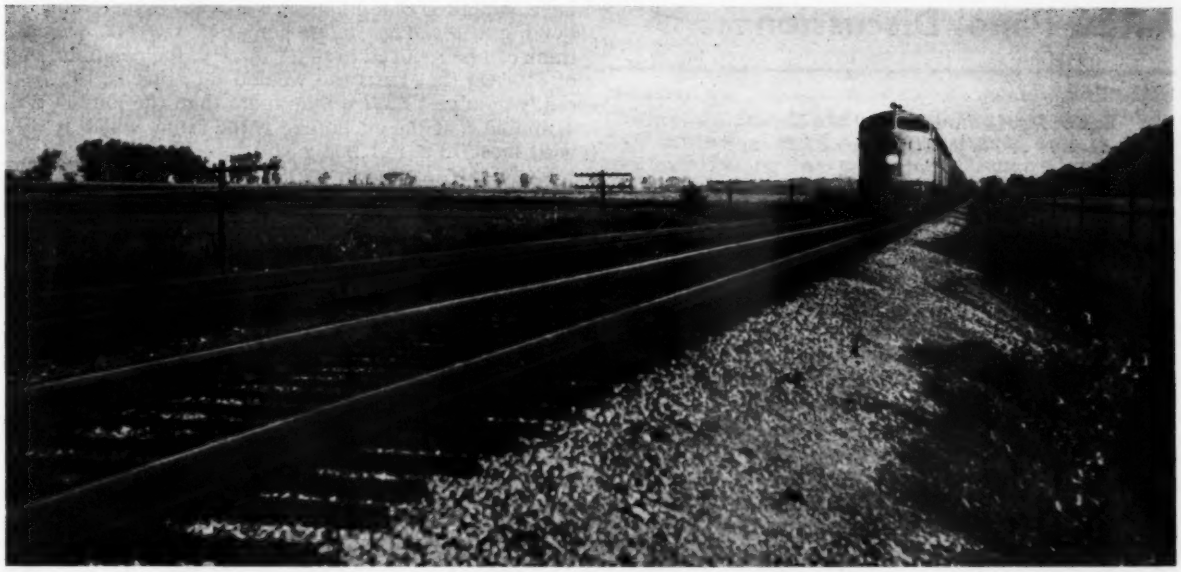
Code: *How many roads are laying 78-ft rail in any quantity?*

Lamport: Four seem to be laying 78-ft rail on more than an experimental basis.

Code: *Mr. Brown, I understand you have laid a considerable mileage of 78-ft rail. What factors were considered in your decision to go ahead with such rail on a large scale?*

Brown: Joint maintenance is responsible for 16 to 20 per cent of all track maintenance. By using 78-ft rail, with only one weld we reduce the number of joints by 50 per cent. If we went to 195-ft rail with 4 welds, the additional reduction would only be 30 per cent. The 78-ft rail presents no problem insofar as laying is concerned. In fact, it lays a little faster than the 39-ft. Furthermore, very little problem is introduced in the unloading of it.

In our adoption of 78-ft rail we considered the likelihood of damage to rail through derailments. Rails of such length can readily be replaced, whereas damage



CONTINUOUS WELDED rail on the C&NW, which also has a considerable mileage of 78-ft rail.

J. C. DeJarnette, Jr.
Chief Engineer
RF&P

L. F. Racine
Chief Engineer
Monon

SELECTION of the panel members was made on the basis of special qualifications possessed by each of them. Mr. Code was just finishing his three-year term as chairman of the AREA Committee on Rail, one of the committees sponsoring this discussion; Mr. Lamport, in addition to extensive experience on his own road with both 78-ft rail and continuous welded rail, is chairman of a Rail Committee subcommittee investigating the service performance and economics of 78-ft rail, collaborating with Committee 5—Track. Mr. Nuckols was in a position to take the "con" side because the C&O is using neither length of rail. On the other hand the Burlington (Mr. Brown's road) has a greater mileage of 78-ft rail in service than any other line. Mr. DeJarnette has had extensive experience in laying and maintaining continuous rail, and Mr. Racine is chairman of the AREA's Special Committee on Continuous Welded Rail, the other sponsoring committee.

to long continuous stretches of rail might necessitate taking out the whole string.

We also considered the presence of shelly fractures. Where such develop in continuous welded rail, it would be necessary to take out the entire rail or to cut it where desired.

On our property we have to supply—from our new rail territory—repair rails for about half the mileage of our railroad on secondary lines. In providing that rail, we feel that the 78-ft rail could be handled much easier than longer stretches. At the present time we have 140 miles of 78-ft rail in track.

Code: *Have you obtained any 78-ft rail from the mills?*

Brown: No.

Code: *It has all been made by welding?*

Brown: Yes.

Code: *Is the 78-ft rail made by welding as satisfactory in all respects as 78-ft rail delivered as such from the mill?*

Brown: We think so.

Code: *How about the question of base reinforcement interfering with tie spacing?*

Brown: We have had some trouble with this, but here again I think that will be solved. It has been solved by some railroads by eliminating the bulge at the weld.

Code: *Mr. Lamport, in what kind of territory would you first consider the laying of 78-ft rail?*

Lamport: I would first consider laying it in troublesome stretches, such as was done two years ago, I believe, by the Louisiana & Arkansas, where they laid 78-ft rail over a swamp 10 miles in length. Through the 78-ft rail and reballasting, they have substantially increased their train speeds over that swamp, and will no doubt decrease their maintenance costs along with it.

AREA Panel Discussion . . .

Code: *Mr. Lamport, what are the maintenance economies of 78-ft rail versus 39-ft rail?*

Lamport: On the basis of information we have at present, the 78-ft rail will cost from $300 to $400 per mile less than the 39-ft rail for maintenance.

• • •

Code: *Mr. Brown, what is your cost of welding 78-ft rails?*

Brown: Our average cost has been about $12. And, as Mr. Lamport has said, that can be reduced. We find that to reduce the cost of welding, it is advantageous to check and double-check the welding crew.

Code: *Mr. Lamport, would you care to comment on the question of changing out a defective 78-ft rail?*

Lamport: I don't believe it presents very much of a problem. Of course, it takes a little different handling than in the case of 39-ft rail, but our failures in 78-ft rail have not created any problems to speak of. You can change out a 78-ft rail with two 39's if you don't have the 78-ft rail on hand, but we keep a stock of 78-ft rails.

joint maintenance presents the most serious problem?

Lamport: Yes, if I were going to limit it to a portion of the laying.

Code: *Mr. Nuckols, you have indicated that you are not sold 100 per cent on 78-ft rail. What are some of your objections and misgivings?*

Nuckols: Surely, the elimination of joints is desirable, Mr. Moderator, but it seems to me there are several things that we should consider before we go into this wholeheartedly. For instance, if the rail comes from the mill in 78-ft lengths, we would be faced with the difficulty, in my situation, of proper drop-end cars for hauling the rail, and the need for the larger cranes—which we do not have at this time—to handle them. Those things have to be overcome before we can go to the 78-ft rail.

Code: *Is there any objection to laying 78-ft rail in mountain territory?*

Nuckols: In my opinion, yes.

Code: *Due to the necessity for transposition due to curve wear?*

Nuckols: Unfortunately, we still have individual rail failures on our railroad. Maybe some do not. We find it is a whole lot more desirable to change out a 39-ft rail than it would be to change out a 78-ft rail. We don't have sufficient forces to handle 78-ft rail, whereas we can handle 39-ft rail.

Comparative Cost Per Mile

Code: *How does the cost of material per mile compare for 78-ft rail made by welding, and 39-ft rail, assuming $10 per ton for the cost of welding?*

Lamport: I don't have the answer on that basis. I have computed that a joint is worth $9.65, including the bond, and a modest figure for a weld is $12, which I think can be reduced to somewhere in the neighborhood of $10. On that basis the welded rail, that is, the 78-ft rail, would cost $297 a mile more than the jointed rail, assuming that the anchorage is the same, which is true with most 78-ft rail being laid.

Code: *Mr. Lamport, we've been talking about 78-ft rail, whereas I believe our topic was standard lengths of rail longer than 39 ft. What were some factors considered by the Rail committee in deciding to concentrate its efforts on the 78-ft length?*

Lamport: Primarily the handling and shipping. The 78-ft rail can be handled better than any longer length, and it was deemed advisable not to go below that. We can handle 78-ft rail either on two flat cars or on 65-ft drop-end gondolas with an idler. Furthermore, it can be worked in with 39-ft rail, particularly around switches, where you might have some 39's, and a 19½-ft joint stagger is better than some other length.

Code: *Mr. Brown, what type of crane equipment is needed to handle 78-ft rail, that is, in laying and in unloading?*

Brown: The same equipment can be used in either case. There is a crane with a 55-ft boom, with spreader bar, with which this can be accomplished.

Code: *How much expansion allowance should be made in laying 78-ft rail?*

Brown: We use the same expansion as we do with the conventional 39-ft rail.

Code: *You make no additional allowance for additional length?*

Brown: That is right.

Code: *Mr. Lamport, in your experience, does 78-ft rail have a tendency to develop its own expansion—that is, to push itself out in warm weather, so that the total expansion finally approximates the theoretical requirement?*

Lamport: With proper anchorage, I see no reason why 78-ft rail should ever reach the theoretical. It has not done so with us. We started out with 1½ times the expansion of the 39, then we laid it with 1¼, and found that was too much. Now, as Mr. Brown has stated, we lay it with the same allowance for expansion as we do the 39.

Code: *And you find you are able to hold it?*

Lamport: That is correct.

Code: *Mr. Brown, how should 78-ft rail be anchored?*

Brown: We anchor our 78-ft the same as we do the conventional 39-ft rail.

Code: *You don't find that any additional anchors are necessary?*

Brown: No, sir.

Code: *Can 78-ft rail be worked—that is, raised, tied and ballasted—in hot weather, or weather that is warmer than the temperature at which it was laid?*

Brown: I think that is one of the definite advantages of the 78-ft rail versus the longer rail.

Code: *In the event of a rail failure, how do you handle it, Mr. Brown? Do you replace with 78-ft or with two 39's?*

Brown: Well, out of 140 miles, we haven't had a failure yet, so that hasn't confronted us, but I think we would put in two 39's, at least temporarily, until we could supply a 78-ft rail. We don't carry the 78-ft, as such, on the individual sections for emergencies. I might say that, in laying our 78-ft rail, we break the joints 19 ft 6 in, so that if we do drop a 39-ft length in we always have broken joints.

Code: Gentlemen, that concludes the time that we

had set aside for direct questioning of the panel by the moderator. We have 10 min. in which we can entertain some questions from the floor.

Question: *Does that cost per joint for welding include the additional handling necessary to take the 39-ft rail to the welding spot and then out on the line.*

Lamport: It does. That is the complete cost, from the time the rail comes into the welding setup until it leaves on cars again.

E. S. Birkenwald (SOU): *I wonder if Mr. Brown can clear up this point. He said that he uses as many rail anchors for the 78-ft rail as he does for the 39-ft rail. Does he mean that the number he uses for the 39 applies to the 78, or is it double the 39?*

Brown: Double the number used for 39-ft rail.

Question: *I'd like to know what weight rail they are using.*

Lamport: I believe Mr. Brown's rail is both 112-lb TR section and 129-lb TR section. We are using 115-lb. The other large users are using 115-lb. On any weight of rail above 115, I see no reason why they shouldn't weld it as well as the 115 and 129.

Question: *Mr. Lamport, are you comparing your cost against a four-hole joint?*

Lamport: No, that was based on a six-hole joint.

L. V. Johnson (Soo Line): *Welding the 78-ft rail shortens the rail. Mr. Brown has never changed one out, but maybe Mr. Lamport can say how the two 39-ft lengths fit in the shorter 78-ft length.*

Lamport: I can't answer that for you, because we haven't had any experience with it either, but I would say that the difference there is about ¾ in, and I'm sure you have bumped rails to pick up that much.

Problem of the Upset

W. D. Almy (CRR of NJ): We use 140-lb rail on our railroad. We're having considerable trouble with the upset on the base. As I understand it, with 100-lb you have practically no trouble with the upset. You can grind it off, but as you get up to the 140-lb section, your base drops down so that if you grind it off you're going to grind off some of your original metal. I am very much interested to find out how you folks are overcoming this upset problem.

Code: *Have you had any experience with that, Mr. Brown?*

Brown: No, sir, we haven't. Of course, it's necessary either to split your tie plate or cut a hole in the tie plate to accommodate this bulge, or to space your ties.

Code: *Possibly Mr. Racine could comment on that, from the information gathered by the Special Committee on Continuous Welded Rail?*

Racine: We did have some discussion about that in the committee, and Mr. Magee, director of engineering research, AAR, went into that quite thoroughly. He reported verbally on November 9, 1954, that he had completed rolling-load tests on six specimens of gas pressure-welded joints, three having and three not having the upset metal removed from the rail base.

With the assistance of graphs, Mr. Magee explained how two specimens were tested under a wheel load of 65,000 lb. The specimen with the metal bulge failed after 115,000 cycles, whereas the specimen with the bulge ground off withstood 600,000 cycles before failure.

He continued with this test, down to a 55,000-lb wheel load, and the specimen having the bulge failed at about 650,000 cycles, whereas the specimen with the bulge removed did not fail up to 2,000,000 cycles, when the test was stopped.

It indicates that the fatigue strength here increases, but there was some question in his mind about the drop test that was made. The two specimens were sent to the steel mills, and I was surprised to hear that the specimen having the upset metal removed failed on the first blow, whereas the specimen having the bulge did not fail until the fifth blow. I think Mr. Magee has requested that six additional specimens be sent to the mill for check on this drop test. He doesn't want to put his reliance on the one test. So it would seem that you are perfectly safe in removing the bulge, or the upset weld, at the base.

Code: *Do you know the weight of these rails?*

Racine: They were 115 and 132-lb, as I recall.

Code: *Mr. Almy, I think you called attention to a very important point, and one that we probably don't have the final answer on, which requires some further development. I believe your railroad has done quite a lot in the way of working with long-length rails; would you care to tell us a little bit about your experience with it?*

Almy: We have about 105 miles of welded rail, i.e., 78-ft rail. In addition, we have also cropped our rails coming out of track, and have put out 70-ft secondhand welded rails which have been used very successfully in our main track; sometimes we have subsequently cropped that coming out of the main track and used it in yards.

This problem of the upset, of course, is one with which we are vitally concerned. Formerly, we cut off the tie plates, or portions of them. Then we started moving our ties. However, you can't do this very well on bridges.

As I mentioned a few minutes ago, our biggest problem is grinding off the upset on 140-lb rail. When you weld it, you not only have an upset on the base of the rail, but the base seems to drop slightly, so that if you were to grind it off, you would be grinding off some of your original section.

I understand from the Oxweld people that they, too, are experimenting with this. They seem to think that proper methods of heating and proper placing of the flame will eventually overcome this problem.

On our railroad we stagger our joints 19½ ft. Also, we probably put our anchors in a little differently from other roads. We put them in at the center of the rail, 16 of them to a rail. Consequently, we do not have our anchors opposite each other. So far, this has proved very satisfactory. I haven't been able to find any ties that were sluing on this account.

So far as the space between rail ends is concerned, we are still using 1½ times that used for a 39-ft rail.

Continuous Welded Rail

Code: *That about uses up our time for the 78-ft rail problem, so we will commence the panel discussion on continuous welded rail. Mr. Racine, what is the present status of continuous welded rail? How much has been laid in recent years, and how much is programmed for this year?*

Racine: The total mileage of continuous welded rail, as nearly as can be ascertained, from 1933 to 1951, inclusive, amounted to 247.5 miles, of which 208.6 miles were in open track and 38.9 miles in tunnels. This mileage increased appreciably through the years 1952-1954. The rail sections involved vary from 90-lb to 140-lb,

AREA Panel Discussion . . .

Code: ***Mr. DeJarnette, what do you find to be good practice with regard to working continuous welded rail in warm weather?***

DeJarnette: The nearer the original laying temperature, the better, but if you don't take too much liberty with it, and disturb only a small piece of track at a time, you can work at considerably higher and lower temperatures.

• • •

Code: ***Mr. Lamport, in case of a transverse break in a stretch of continuous welded rail, what is the likelihood of having it pull apart excessively in cold weather?***

Lamport: It will, no doubt, pull apart to some extent, but if it is properly anchored, I don't think the pull-apart will be enough to cause a derailment. No doubt, you would feel it when going over it, but with the proper anchorage I don't think it would pull apart enough to create a hazard.

with the 131 to 140-lb accounting for approximately 75 per cent of the total mileage.

In 1952, on 23 railroads throughout the United States, a total of 33,783 welds were made of which approximately 40 miles were of continuous welded rail. The balance was in double and triple lengths in various locations.

In 1953 a total of 48,987 welds were made on 17 railroads throughout the United States, with approximately 80 miles of continuous welded rail, and the balance on double and triple-length rails used on miscellaneous projects.

The proposed rail welding for 1955 is problematical. We have secured some information from the Oxweld people, and from the Matisa Equipment Corporation, and it looks as though there will be a possible total of 235 miles of continuous welded rail using the Oxweld method, laid on 15 railroads throughout the United States in 1955, and approximately 90 miles using the Matisa flash butt weld, or, at the end of 1955, there should be approximately 750 miles of continuous welded rail in service.

Methods of Welding

Code: *What methods of welding have gained general acceptance?*

Racine: The oxyacetylene pressure weld accounts for practically all continuous welded rail. The Matisa Equipment Corporation is now entering the field with the flash butt weld, and this competition will be welcomed. There has been some talk about the Sperry people entering the field, but there is nothing definite about that at the present time.

Code: *What is the view of your committee as to the relative economy of continuous welded rail on a long-range basis?*

Racine: The committee seems to think there is considerable saving through the use of continuous welded rail; that there should be a saving of probably $650 a mile in joint maintenance.

Code: *What is the present thinking as to the best temperature for laying continuous welded rail?*

Racine: There is some question about the temperature at which the rail should be laid. It is recommended, however, that wherever practicable the rail be laid during the summer season, preferably at temperatures ranging between 70 and 90 deg F.

In locations in the extreme South and in the extreme North, these limits should probably be slightly increased or decreased, respectively. Continuous rails have been installed at temperatures as low as 28 deg F and as high as 130 deg.

It is recommended that any out-of-face surfacing, lining, tie installation, etc., be done at temperatures comparable to those at which the rail was laid.

While we have no definite information about this, you shouldn't attempt to do any of this work at temperatures 15 deg above that at which the rail was laid, and the work should preferably be at temperatures lower than that at which the rail was laid.

Code: *Mr. DeJarnette on a long-range job where rail must be laid at widely varying temperatures, should anchoring and end expansion be adjusted later?*

DeJarnette: Yes.

Code: *In other words, you start out on a long program of laying continuous welded rail and you probably have to take the temperatures the way they come.*

DeJarnette: That is right. When you make your plans and divert your traffic, you have to carry your plans through.

Making Closure Welds

Code: *Mr. Racine, how should closure welds be made?*

Racine: Closure welds are made according to the desires of the individual railroads. Some prefer the field weld rather than the conventional joint closure, and both have been satisfactory. I understand that the Santa Fe is now using the conventional joint instead of the field weld.

Code: *Mr. DeJarnette, how do you feel about closure welds?*

DeJarnette: We have eliminated closure welds. We lay most of our rails in strings of 39-ft rails welded together, and use conventional bolted joints in the field.

Code: *Do you find it necessary to make any special provision with respect to the joints at the ends of welded stretches—insulated joints, for instance?*

DeJarnette: We put in short rails each side of the insulated joints, and at the ends of the strings we extend our anchoring pattern six rail lengths on the conventional rail.

Code: *This matter of using short rails adjacent to the insulated joint—was that the result of your experience with some difficulty?*

DeJarnette: Yes. We had difficulty with the thimbles in the insulated joints; the bolts wore through the thimbles.

Code: *In other words, the additional expansion provided by a couple of short rails was found to take care of that?*

DeJarnette: Yes.

Code: *How should continuous welded rail be anchored, Mr. DeJarnette?*

DeJarnette: We have accepted the recommendation of the Committee on Continuous Welded Rail for anchoring. Starting at the end of the string, we anchor six rail lengths, boxing every tie. Between the end anchoring we box-anchor every other tie. We do this so that in case there is a break the rail won't pull apart.

Reasons for Hesitating

Code: *Mr. Nuckols, your road has not seen fit to lay any long stretches of continuous welded rail, and there are many others like you. What considerations make you hesitate?*

Nuckols: The terrain traversed by our railroad generally—except in a few instances along the river beds—is in mountainous territory, with heavy curvature, and we do not think at this time that laying continuous welded rail in such territory is the proper thing to do, because, as I said before, occasionally we have a rail fail in track, and it would be rather difficult, as well as costly (we estimate $60), to change out a 39-ft section of rail.

Code: *Mr. Racine, what is the additional cost of continuous welded rail, per mile, compared with jointed track, including the additional anchors?*

Racine: We haven't developed anything too accurate on that. Statements have been made that continuous welded rail will cost all the way from $2000 up to $3000 per mile more than conventional rail. We expect to have some reliable information on this at the close of this year.

Code: *Mr. Racine, I believe I asked you before about removing the reinforcement, and you covered that in connection with the 78-ft rail.*

Racine: I might say, Mr. Code, that Mr. Magee was satisfied with the fatigue tests as developed by the rolling-load tests, and is willing to advise anyone who desires to remove the upset metal from the base of 115 or 132-lb rail to do so, because the two sections have a great deal more reserve strength in them than is needed for today's service.

G. M. Magee (AAR): Mr. Racine has stated the situation accurately. We undertook to make some tests for the committee, to compare the effect of welds where the bulge was removed and where it was left on, and the fatigue test showed that removing the bulge from the base did increase the fatigue strength, because of the fact that it eliminates the change in section and the stress concentration effect that is produced at the bulge in the base.

We were puzzled by the results in the drop test, and before we issued any final report on it, we thought that we would like to repeat the drop test and be sure of those results. However, as Mr. Racine stated, I feel that we have so much reserve strength in the 115 and 132-lb sections, from the standpoint of bending stresses, that we don't need to be too much concerned about some reduction in strength due to removal of the bulge.

Code: *Mr. Nuckols, many roads follow a definite program of buying new rail for their main line only, taking care of branch lines by relaying rail from the main line when it has gotten to the point where the cost of maintaining line and service for high speed has become excessive. Would this consideration make you hesitate to embark on a program of continuous welded rail?*

Nuckols: Definitely. On our railroad we use the released rail from main lines in maintaining our side or branch lines, as well as for newly constructed lines. If we were to go into welded rail to any great extent, we feel that it would be most difficult to handle this rail for replacement in branch lines or in newly constructed lines.

78-Ft Vs Continuous Rail

Code: *Mr. Brown, you evidently prefer the 78-ft rail to continuous welded rail. What objections do you have to continuous welded rail?*

Brown: We don't have any objections to continuous welded rail as such. Probably I could sell Mr. Nuckols some 78-ft rail rather than continuous welded rail, to take care of his secondary lines. That is our problem. We think we can handle the 78-ft rail about the same as we handle the conventional 39 for our secondary lines.

Code: *How does the problem of transposing rail affect your thinking about continuous welded rail?*

Brown: With the 78-ft we don't have any difficulty. With continuous welded rail, I'm not in a position to say.

Code: *We have about 10 min now for discussion and questions from the floor. Would someone care to present a question to the panel?*

Question About Costs

C. J. Geyer (C&O retired): From the various panel replies, Mr. Code, I understand they do not know the relative cost of 39 and 78-ft rail, nor do they know the cost of the continuous welded rail—that is, the annual cost per mile. I am wondering how any road can reach a decision as to the method or type of rail to use if they do not know the relative costs involved.

Code: *Mr. DeJarnette, I believe you had some views on possible savings in connection with continuous welded rail?*

DeJarnette: No detailed figures, Mr. Code. We laid our first continuous welded rail in 1950. It was tamped after laying. We have spent $460 in labor on that 2-mile stretch, and we don't anticipate any out-of-face working for the next 2 to 3 years.

Code: *But you don't have any direct comparison of that track with the cost of maintaining jointed track?*

DeJarnette: No. We're going to keep figures on that in comparison with the adjacent track.

Code: *If Mr. Ferris is in the audience, we'd like to ask him a question. Mr. Ferris, would you like to comment on the problem of taking care of a broken rail in a long stretch of continuous welded rail?*

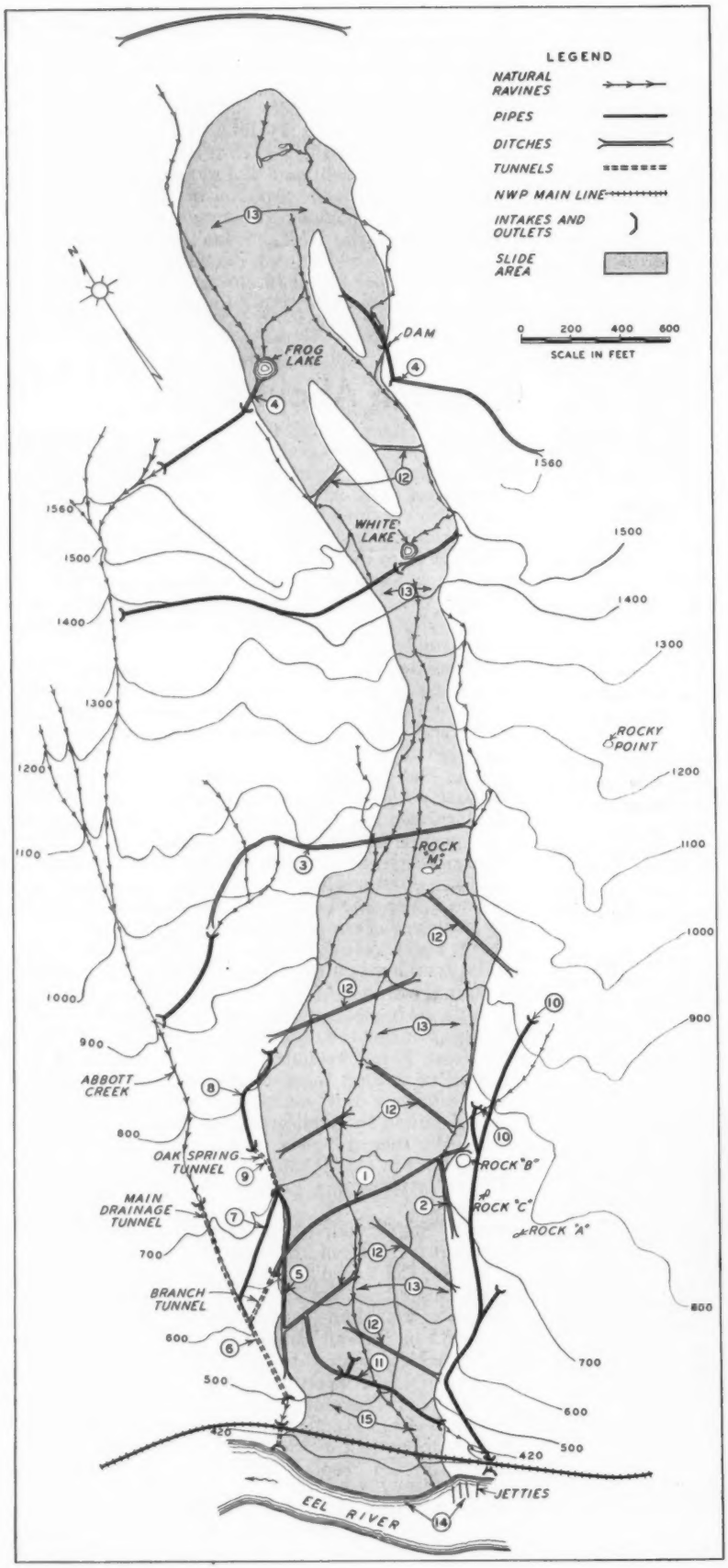
P. O. Ferris (D&H): If the break occurs during the regular working hours when men are readily available, we go out with a saw, a power wrench and a drill and cut out a 39-ft piece and replace it with a 39-ft rail. If it happens during the night or at hours when the regular track force is not available, or when there may be a question of getting together the necessary number of men to take care of it, we have some 19-ft 6-in rails that can be handled by small gangs, all drilled and ready to put in. We then go back at some advantageous time later and put in a 39-ft rail.

Code: *Is there any problem in taking care of expansion?*

Ferris: No. Of course, you must try to keep the track the way it is found and don't let it move as you start to put in your rail to replace the section of welded rail removed. Sometimes we would find failures of Thermit-pressure welds where the rail pulled apart at the weld 1½ in to 1¾ in, the rail running back through the fastenings in each direction 3 to 3¼ rail lengths.

The policy is to keep the rail in tension wherever it can be done. Therefore, care must be used to hold the stretch of rail exactly as it is found by tightening the clip bolts to prevent it from further movement when the rail is inserted to replace the section of welded track removed.

Code: I want to thank the members of the panel very much for their help, and our audience for their kind attention and their contributions to the discussion.



What Was Done at Kekawaka

Each of the individual project descriptions is prefaced by a number from 1 to 15 respectively. These numbers refer to the locations indicated on the map at left.

(1) Large ditch reconstructed across the slide from the vicinity of Rock "B" to connection with the branch drainage tunnel; lower 340 ft of the ditch lined with scrap tank material.

(2) A diversion ditch for emergency use constructed from the vicinity of Rock "B" to the ravine which parallels the slide on the easterly side. This ditch is to be used if slide movement affects the large ditch leading to the branch tunnel so that water from easterly side of the slide cannot be directed to the branch tunnel.

(3) A diversion ditch dug across the narrow throat of the slide at approximately the 1200-ft contour and thence to Abbott creek.

(4) Rebuild the diversion works at Frog Lake and the west side ditch opposite Frog Lake.

(5) By-pass ditch regraded and the tie revetment between entrance to branch tunnel and Abbott Rock was renewed.

(6) Bottom of Abbott Creek drainage tunnel lined with concrete at the lower end.

(7) Existing 6-in pipe line between Oak Spring tunnel and shaft No. 1, Abbott Creek tunnel, replaced with 12-in corrugated pipe.

(8) Existing 4-in pipe line between shaft at end of Oak Spring tunnel and intake at Water Cress spring replaced with 6-in pipe.

(9) Repair timbering in Oak Spring tunnel.

(10) Intake to pipe lines on west side of slide above Rock "B" reconstructed.

(11) Intakes and pipe lines between Fishers Spring and track rebuilt.

(12) Various diversion and intercepting ditches dug along the slide area.

(13) The rough and cracked surface of the slide smoothed down with bulldozer to prevent saturation and to expedite run-off of water.

(14) Usable portions of rail jetties in river repaired and some new jetties erected and rip-rap rock placed to reduce damage from river and assist in stabilizing toe of slide.

(15) Several check lines established across lower portion of slide for purpose of detecting future movement. Monuments were set on stable ground on both sides of slide, and boiler tubes were placed within the slide area at intervals.

TUNNELS have been constructed to drain upper areas of mountainside.

Extensive preventive measures have been taken on the Northwestern Pacific to reduce the hazards of slides along that portion of its line through the Eel River canyon in northern California. Included in the project are elaborate drainage systems to reduce the lubricating action of water on unstable subsoil layers, and anchored timber and concrete trestles designed to withstand heavy impact from falling rocks.

SLIDE AREA near Kekawaka, Cal., in Eel River canyon, has been scene of two disastrous slides that threatened to engulf railroad and push it into river. Steps are currently being taken to prevent recurrence of trouble.

How NWP Fights to Tame Unruly Mountains

● Slides caused by unstable ground and spalling-off of canyon walls have been a perennial problem on the Northwestern Pacific. A considerable part of this road runs through the Eel River canyon in northern California where rainfall ranges from 50 in to 100 in in a season extending from mid-autumn to mid-spring, and here the line has been plagued by slide problems throughout its history. Over the years, extensive drainage systems have been installed along the canyon slopes far above the track to carry off surface drainage and reduce the lubricating action of the water on the subsoil layers. In addition, considerable wall and trestle work has been carried out through the canyon to protect the track from damage by rock slides and from the river.

At Mile Post 201 near Kekawaka, Cal., the terrain is unstable on both sides of the main track for a distance of approximately 1,000 ft. This unstable condition extends from the bank of the river across the railroad and for approximately a mile on the uphill side. In this distance the ground rises approximately 1,500 ft.

In 1925-26 this large area became an active slide, and surface drainage improvements were made to control the earth movement. For more than a decade afterward, the movements were of a minor nature, but in 1938 a slide of major proportions developed, destroying the natural contour of the ground above the track, obliterating the natural ravines and smaller drainage tributaries. It was then necessary to provide a new drainage system by installing flumes and pipe drains and by bulldozing new ditches. A main drainage tunnel was dug, with branch tunnels leading to it, and concrete and steel-grill intakes were provided to take the drainage from ditches, pipes and flumes.

PIPELINE systems have been installed in recent years along upper portions of slide area to carry off surface water and reduce its lubricating action.

Further serious movements of the earth in this area did not occur again until early last year, when a major movement took place similar to the 1938 trouble. Emergency measures to keep the line open during this last slide were described in the May 1954 issue of *RT&S*.

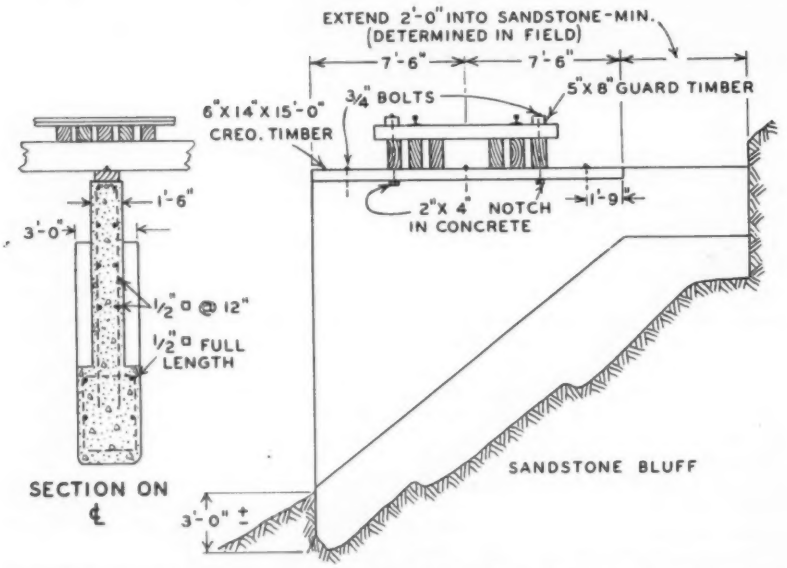
The battle to maintain rail service over the line, which carries two passenger and six freight trains daily between San Francisco and Eureka, Cal. was won after many weeks of round-the-clock operations. Following the end of the rainy season last spring, extensive plans were made to restore the drainage system, which was almost completely destroyed by the slide, and to take further corrective measures designed to prevent a recurrence of the trouble at this location.

The preventive measures adopted

How trestle was strengthened . . .

SCOTIA BLUFF is another troublesome spot along Eel River canyon. Bluff has geological faults which, coupled with erosion along face, have caused large masses of material to fall onto trestles below.

CONCRETE bents are progressively replacing timber bents on trestles alongside bluff. Note rail used to tie bents together, giving more rigid structure.



HEAVY bents of reinforced concrete and anchored deeply into side of sandstone are reported to stand up well under impact from falling material.

have now been carried to completion and are outlined in the map and text on page 36.

During the reconstruction work at Mile Post 201, personnel for the job were headquartered at Kekawaka. A 4-wheel-drive truck was employed to transport men, fuel and material up the mountain from Kekawaka. Existing roads at that point were repaired so that the truck could operate over them. The road reports that use of this truck greatly increased the efficiency of reconstruction operations.

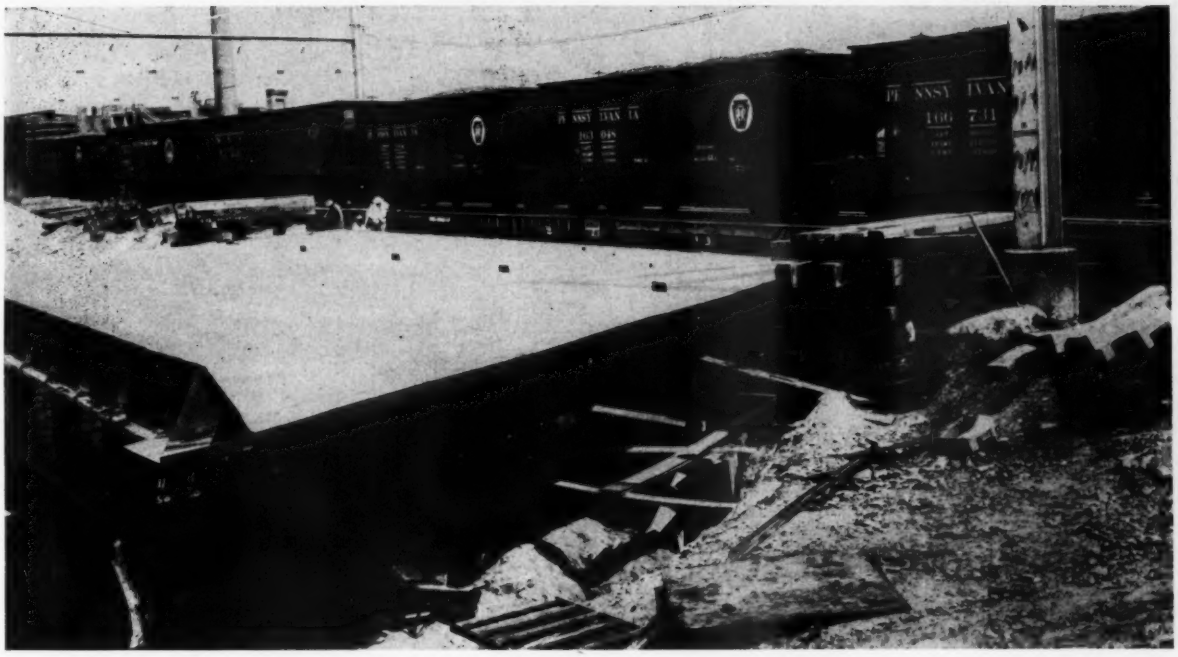
The program of providing special anchorage for trestles so that they are able to withstand heavy impact from falling rocks and slides is being carried out near Scotia Bluff. At this point the railroad is located on the easterly side of the Eel river on trestlework and benches cut into the face of a soft sandstone bluff that rises nearly vertically from 75 to 300 ft above the track grade for a distance of 1.7 miles. Within this distance there are 3,776 ft of trestles immediately alongside the base of the bluff, the trestles varying in height from 5 to 30 ft.

The geological structure of the bluff is such that the soft sandstone develops seams during seasonal weather changes. A geological fault line runs along the bluff and down the Eel river. The face of the bluff spalls off, usually leaving an overhang with a crescent-shaped arch support. In time a seam develops upward behind this overhang until the overhang breaks and falls.

Original trestles were of framed timber construction with the posts set on either wooden sills or on individual concrete footings placed on benches cut into the sandstone base. Since 1936, 55 framed timber bents have been progressively replaced with concrete bents, deep seated in the sandstone base and anchored back into the face of the bluff. They have successfully withstood impact of falling material.

In 1943 two manually-operated electrically-controlled indicator signals were installed, one at each end of this territory, as an added measure of protection. If the trestles are disturbed by falling materials, the indicator signal is automatically set to "stop." A watchman patrolling the track can set signals manually.

The projects in the Eel River canyon have been carried out under the general direction of E. E. Mayo, for many years chief engineer of the NWP and Southern Pacific, who was recently appointed vice-president of an SP subsidiary, Southern Pacific Pipe Lines, Inc. G. L. Morrison has also taken a very active part since he became vice president and general manager of the NWP in 1951. Direct supervision of the work has been handled by Albert L. McHenry, formerly division engineer on the NWP and now assistant division engineer on the SP, and C. E. Neal, current division engineer on the NWP. F. L. Monroe, engineer drainage on the SP, has also taken an active part in the projects.



DECK CONSTRUCTION is shown by this view of assembled span ready for shifting into final position.

This All-Welded Bridge Has...

• BUILT-UP STRINGERS

• WROUGHT-IRON DECK

First steel structure on Pennsylvania to be constructed without rivets carries the road's five-track electrified line over a busy highway at Baltimore. Welded construction was used for building up stringers, as well as for joining sections of wrought-iron deck. Deck is paved with bituminous concrete to give a completely watertight floor.

By R. B. Russell
Assistant Office Engineer
Pennsylvania
Philadelphia, Pa.

HOOKS were welded to outside stringer on each side for bonding poured-in-place concrete fascia and railing to steelwork.

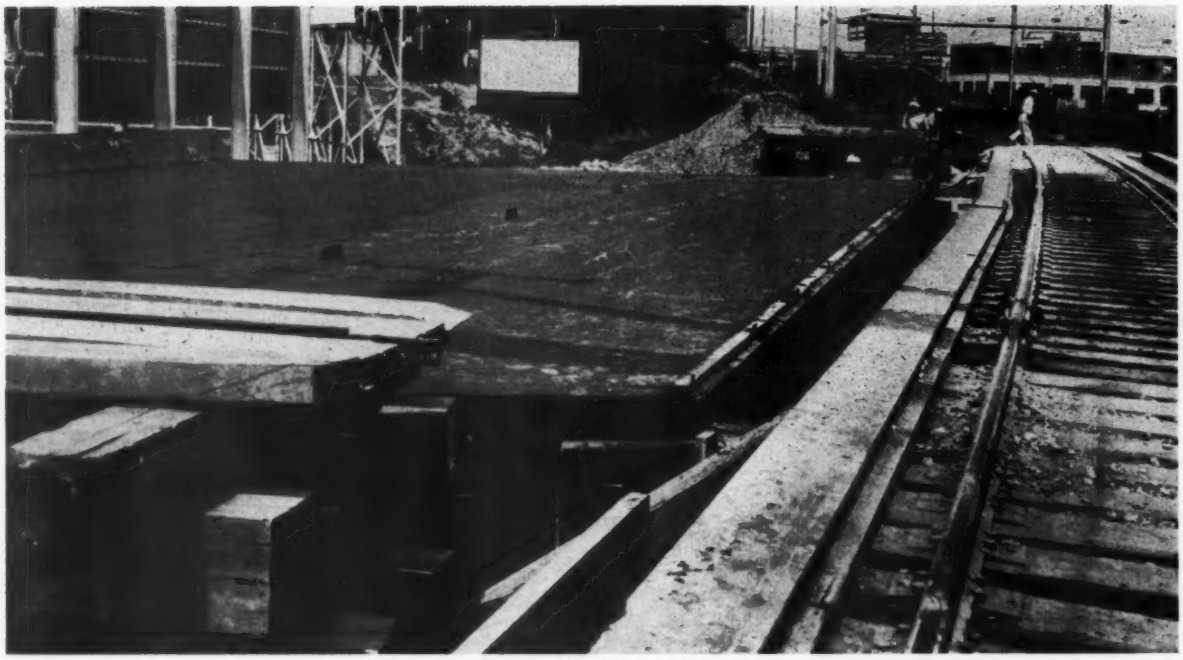
● Considerable savings in steel requirements, plus quicker and easier erection, were among the advantages obtained from the use of all-welded stringer and deck plate construction on the Pennsylvania's new Mulberry Street underpass at Baltimore.

The new 62-ft structure carries the five electrified tracks of the road's Maryland division over a heavily-traveled highway in the southwest section of the city. The project was initiated as a step towards the relief of traffic congestion in this area, particularly at the existing Franklin Street underpass a short distance away.

The structure chosen for the underpass is a steel stringer bridge with a welded wrought-iron-plate floor paved with bituminous concrete. Tracks are supported on ballast. Each side of the underpass is finished with a concrete fascia and railing attached to the outside stringer.

Advantages of Design

This general type of bridge, utilizing wide-flange rolled beams for stringers, has been used by other roads for a number of similar structures constructed since



BRIDGE sections were assembled, one on each side of tracks, and rolled into place after temporary structures were raised.

World War II. It is economical when compared with other types of design, provides a watertight deck, and is light in weight thereby facilitating the rolling-in of sections, two or more tracks wide, in a minimum amount of time.

The latter feature was especially important on this particular installation because of the high density of railroad traffic, the amount of time during which any one track could remain out of service being limited to eight hours.

Mulberry Street at the underpass is 40 ft wide between curbs with 5-ft sidewalks. The new bridge is skewed to an angle of about 63 deg with the tracks. The structure is designed for the heaviest PRR loading which approximates Cooper's E-72. However, the heaviest rolled sections available were of insufficient strength for this span and load. Hence it was decided to build up stringers 40 in deep and 62 ft 3 in long to be placed 2-ft 8-in centers.

A comparison between welded and riveted designs indicated that the use of welded stringers would result in a 17 per cent saving in the weight of steel. Another distinct advantage of the welded stringer was that a smooth top flange could be obtained for the support of the wrought-iron deck plate without the need for countersunk rivets.

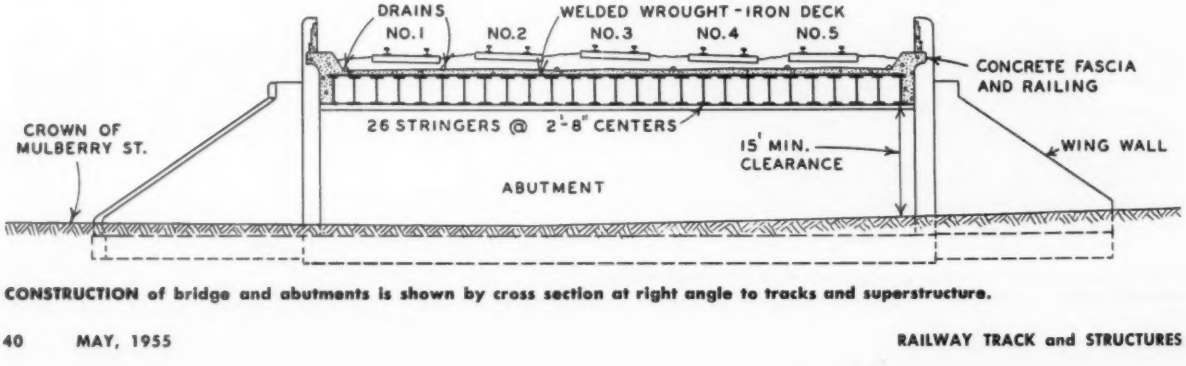
The bottom flange plate of each stringer was welded to the web of a ½ in fillet weld on each side. The top flange was connected by a tee butt weld reinforced with ⅜ in fillet welds. Stiffeners were welded by ¼ in fillet welds, the end stiffeners being welded to both web and flanges, and the intermediate stiffeners to the web only. All welds are continuous.

How Deck Was Welded

The underside of the ½ in wrought-iron deck plate was welded on each side of each stringer flange with a continuous ¼ in fillet weld. Floor plates were 64 in wide and were joined by continuous vee welds on the centers of alternate stringers.

A bituminous concrete paving, varying from 2½ in to 1½ in. in thickness, was placed over the plate floor. Half round perforated wrought-iron drains were installed at the curbs and between tracks to carry water to the low end of the bridge, the grade in this instance being 0.5 per cent.

The bridge was fabricated by the Maryland Drydock Company, Baltimore. All welding of built-up stringers was done in the fabricating shop. Shipment was made in units consisting of two or three stringers connected by their welded diaphragms. The wrought-iron deck



CONSTRUCTION of bridge and abutments is shown by cross section at right angle to tracks and superstructure.

COMPLETE with concrete railings and fascia, new structures provide attractive underpass for heavily-traveled highway.

plates were welded at the site, as were the diaphragms connecting units of stringers.

The superstructure was erected on falsework in two sections, one on each side of the railroad, each section complete with wrought-iron deck plate, bituminous concrete paving, and one track mounted on blocking. The bridge sections were rolled into position on skid bents located just in front of the new abutments and were jacked down onto their permanent rocker bearings.

Railroad traffic was carried on a temporary steel trestle during construction of the concrete abutments. The trestle was constructed without interference to railroad traffic and, because of the presence of the electrified catenary system, with as little use of overhead equipment as possible.

Construction of Temporary Trestle

The first step in the construction of the temporary trestle was to substitute 10 in by 12 in sawed timbers for the regular track ties. These were placed on 16-in centers. Wide-flange beams were then placed against the ends of the 10 by 12's, with the timbers resting on continuous blocking laid on the inside bottom flange and wedged tightly against the top flange. Tie rods held the assembly together. The temporary beams were spliced by full butt welds and welded flange reinforcing plates to form continuous stringers 116 ft 9 in long. Timber end sills were placed under the stringers on approximately 20-ft centers, and the ground between excavated to a depth of about 8 ft below top of rail.

Four lines of steel caissons made up of tunnel-liner plate sections were then sunk, one line on each side of the proposed abutments. These were carried to rock approximately 23 ft below top of rail. A 12-in concrete base was poured in each caisson and steel columns placed to support the track stringers. Excavation was then carried down to the bottom of the abutment foundations between lines of 4-in timber sheeting.

At this stage, the temporary track supporting the new superstructure was carried on mud sills at each end, four lines of steel columns, and two lines of short timber bents located on the partially excavated ground between abutments. This excavation was carried down just far enough to clear the new superstructure to be rolled in.

Placing of Superstructure

Only one day was required for rolling-in each section of the bridge. The two-track easterly portion of the bridge was the first to be installed, the procedure being as follows:

Steel columns and timber bents supporting track No. 1, the most easterly track, were disconnected and removed and the track was cut at each end of the temporary stringers. Track No. 1 structure was then lifted by wrecker derricks at each end and placed on blocking clear of the new bridge section to be rolled in. Track No. 2 structure was lifted in place and blocked up so as to clear the new superstructure. The new structure, complete with rails and ties for track No. 1, was then rolled into position, after which track No. 2 was lowered to blocking placed on the new deck. Both tracks were then connected and placed in service. Ballast was placed later, at which time temporary blocking under the tracks was removed and regular track ties installed in place of the 10 by 12 timbers.

The procedure for rolling-in the three-track westerly portion of the bridge was substantially the same as that described above. The two bridge sections were joined by welding the diaphragms and deck plates located between tracks No. 2 and No. 3. The construction of the concrete fascia and railing completed the assembly of the bridge.

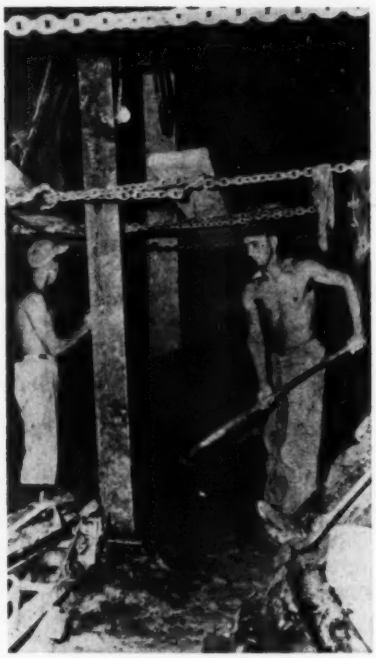
The bridge was designed by and built under the supervision of the engineering department of the PRR's Eastern Region. The general contractor was A. S. Wikstrom, Inc.

OPENING, consisting of 144-in metal culvert, was provided to carry discharge from city sewer system under C&EI tracks at Mt. Vernon, Ind.

The Chicago & Eastern Illinois recently installed 178 ft of 144-in diameter culvert to carry storm drainage under its tracks and into the Ohio river at Mt. Vernon, Ind. Over 100 ft of the pipe was tunneled through an existing fill by railroad forces.

To Provide 12-ft Opening . . .

EXCAVATED material from leading end of tunnel was carried by a conveyor system to tunnel opening where it could be dumped and removed by a dragline.



TUNNELING was carried out using steel liner plates and timber headers.

Tunnel Driven Through High Fill

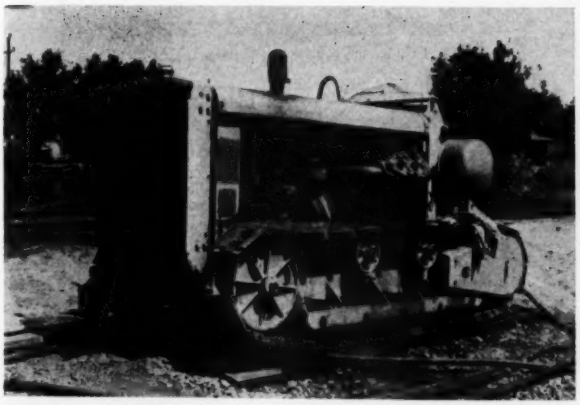
● To tunnel through more than 100 ft of tough, compacted-clay fill 36-ft deep may seem like quite a project for a railroad's bridge and building forces to tackle, but they did it on the Chicago & Eastern Illinois. The tunneling job was carried out in conjunction with the installation of a culvert 12 ft in diameter at a new river-rail coal handling facility the railroad has built adjacent to the Ohio river at Mt. Vernon, Ind. Armco tunnel liner plates were selected for the tunnel lining, and in doing the work the railroad used a variety of mechanized equipment, including a power-driven belt conveyor system for removing the excavated material.

Background of the project is this: Additional trackage had to be built at that point to accommodate cars being loaded at the facility. An existing single track bordered the river, serving industries on the river front. In the vicinity of the new coal-handling installation a 214-ft timber trestle carried this track over a ravine through which storm drainage from the city is discharged into the river.

It was necessary to fill in this structure to obtain the additional roadbed width required for the new trackage. Also the approaches at each end of the bridge had to be widened. Before filling in the trestle, an opening had to be provided for the storm drainage which, on occasion, is quite heavy. Because of problems of location, the culvert could not be placed under the old trestle but at a point some distance from the trestle about in line with the storm-sewer effluent.

Open-Trenching Ruled Out

The existing fill at the chosen location was over 100 ft wide and 36 ft deep, measured to the flow line of the proposed culvert. Officers of the road felt that the depth



CRAWLER compressor furnished air for operating impact wrenches used in tightening liner-plate bolts and . . .

DRAGLINE was used for open trenching at ends of tunnel. Here, machine is breaking through to advancing end of tunnel.

. . . PNEUMATIC spades which were used for digging in hard clay.

of the fill made open trenching impractical; the only alternative was to do the job by tunneling. For this reason it was decided to use Armco tunnel liner plates, and to handle the flow, a culvert 144 in in diameter was selected.

The tunnel was started from the river side of the fill after digging an open trench as far as possible with a Bucyrus-Erie ½-yd dragline. Pneumatic spades powered by an Ingersoll-Rand Model 105 crawler-mounted air compressor, in addition to standard hand tools, were used to dig out the hard material. After the tunneling had progressed for some distance, an electric-powered endless-belt conveyor system, eventually comprising two 12-in belts and one 8-in belt, was used to carry excavated material to the mouth of the tunnel where it could be removed by the dragline.

As the tunneling progressed, liner-plate sections were bolted in place using pneumatic impact wrenches for tightening the bolts. Timber headers were used where necessary to prevent the material from caving in while top sections of the liner were being erected. Shoring, consisting of 6-in by 8-in timbers, was installed, to strengthen the steel liner during construction.

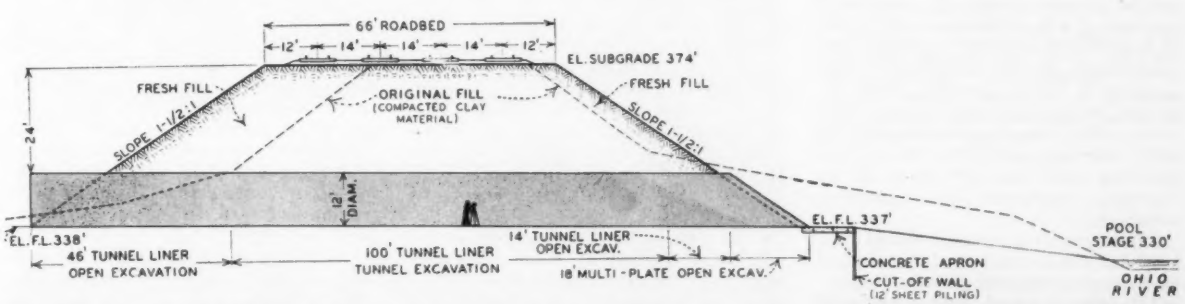
Blower Gives Fresh Air

To provide adequate ventilation for workmen during the tunneling, an electric blower fan was mounted at the tunnel opening and duct work installed along the inside of the tunnel to supply fresh air. Lighting inside the tunnel was provided by strings of incandescent lamps.

After the tunnel had been driven through the fill for about 100 ft, workmen were able to break through into an open trench that had been dug on the opposite side of the embankment by the dragline. From then on the construction of the remaining portion of the pipe was comparatively simple.

After the entire 178 ft of culvert had been erected, the invert was paved with 4 in of concrete to provide a smooth, even waterway and to reduce abrasive wear on the pipe. New fill material with a slope of 1½ to 1 was dumped on each side of the existing fill to widen the roadbed to the desired 66 ft, thus completing the project.

In order to speed up installation of the culvert, two shifts of workmen, consisting of a bridge gang and a carpenter gang were employed on the project. Since the work was being carried out in the tunnel with artificial lighting anyway, officers felt that the use of two shifts was warranted. None of the men working on the project had any previous experience with tunneling.



DEPTH OF FILL at this location precluded use of open-cut installation methods for most of pipe. About 100 ft of the culvert was tunneled through the original fill, the remaining 78 ft by open cut. Invert was paved with 4 in of concrete.

Adopted by AAR . . .

10 Motor-Car Rules

● Acting on a recommendation of a special committee on Track-Car Protection, the Board of Direction of the Association of American Railroads has approved and adopted as recommended practice for its member roads, a set of 10 rules to be incorporated in rules governing the operation of track motor cars under the line-up system. The new rules are intended for use by member roads "as minimum standards for supplemental rules" covering motor-car operation.

How It Started

In 1954, Owen Clarke, a member of the Interstate Commerce Commission, called attention to the need for action to assure the safe operation of track motor cars, and requested the AAR to give the matter "prompt consideration" because it is "primarily a problem in railroad operation." As a result, the AAR appointed a subcommittee on Track-Car Protection of the Committee on Train Operation Control and Signals. The subcommittee, headed by J. M. Trissal, assistant chief engineer, Illinois Central, began its studies in 1954. Among other things it found that existing rules relating to the operation of track motor cars under the line-up system were in some instances contained in several rule books. The feeling of the committee was that rules should be spelled out in one place as an aid and convenience to rules examiners and the employees who are required to use them. As a result of the work of the committee the 10 rules were adopted and recommended for approval. These are printed elsewhere on this page.

Line-up Form Also Offered

The committee also recommended a line-up form for use in connection with these rules, which, besides including space for indicating the trains operating in the territory involved, contains additional space for entering the time that a motor car occupies the track. The line-up form, which is offered with the thought that individual railroads may wish to adapt it to their own needs, will also permit checking of the accuracy of recording information furnished by the dispatcher concerning the movement of trains.

In making its report the committee not only recommended adoption of the 10 rules as minimum standards but also urged that the rules be brought to the attention of member roads in the most effective manner possible in the interest of safe operation of track motor cars.

TRACK CAR OPERATOR'S LINE-UP OF TRAINS

Station _____

LINE-UP OF TRAINS expected between stations _____ and _____

between the hours of _____ M and _____ M, Date _____ 19__

Northward
or Eastward Trains:

Southward
or Westward Trains:

RECORD OF MAIN TRACK OCCUPANCY

LOCATION	TIME CAR PLACED ON TRACK		TIME CAR IN CLEAR		LOCATION
		M		M	
		M		M	
		M		M	
		M		M	
		M		M	
		M		M	

This line-up has been read aloud to all other occupants of track car.

_____
Track Car Operator

Note: A separate sheet should be used for each line-up secured during each work period.

SUGGESTED line-up form for use by track-car operators.

The Rules Listed

Here are the 10 motor-car rules adopted as recommended practice by the AAR:

(1) Track car operators should be examined on track-car operating rules, such examination to be made a matter of record, supported, if desired, by certificate to be carried while on duty. Examination to be repeated at stated intervals. (Note: As an aid to those required to take such examinations, it is suggested that railroads which have not consolidated all track-car operating rules and instructions, do so, supplying examiners with appropriate catechism.)

(2) All track car operators should carry a reliable watch which should be checked for accuracy each work period.

(3) When practical, track cars should not be placed or moved on main tracks unless current line-up has been received by track-car operator. If the track-car operator does not have the currently effective line-up, or if it is not possible for him to obtain one, track car should be operated as prescribed by rules of the individual railroad.

(4) Line-up of all trains should be issued by train dispatcher, for stated period and specified territory, retaining copy for the record.

(5) Line-up should be repeated back by one or more of the recipients thereof and should be read aloud to all other occupants of the track car and be in possession of person in charge of the track car.

(6) Line-ups for each work period should be forwarded to a designated supervisory officer for checking.

(7) It is recognized that line-ups will not contain information as to all train and yard movements within yard limits. Track car operators should be governed accordingly.

(8) Train dispatcher should take necessary action to see that no train operates in advance of the time shown on line-up (or timetable) unless such train is fully advised by train order or otherwise of the circumstances and instructed to be on the lookout for track cars and to use whistle freely.

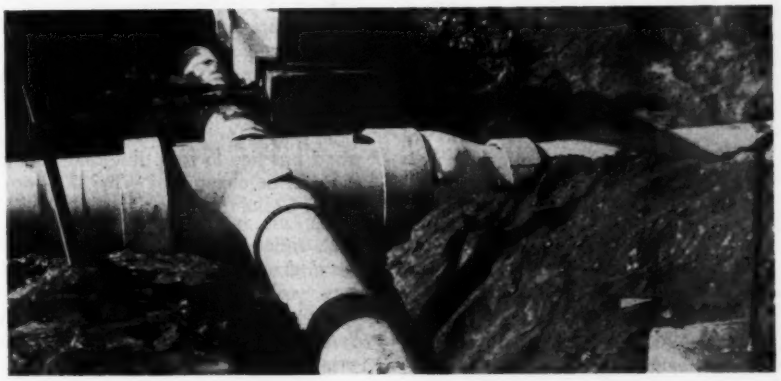
(9) When trains are operated that are not shown on line-up (or timetable) train dispatcher should see that such trains are fully advised by train order or otherwise of the circumstances and instructed to be on the lookout for track cars and to use whistle freely.

(10) In preparation of line-up, information should be included which will indicate to track-car operators whenever certain trains may run faster than usual, due to tonnage, special equipment, etc.

NEW TRAIN SHED of umbrella type is being erected at the Pennsylvania's Pittsburgh (Pa.) passenger terminal. New shed is part of a $27-million terminal improvement program in progress at that point. Tracks have been realined, and longer, wider unobstructed platforms are being built. Other improvements include: A moving electric stairway to carry passengers across tracks to train platforms; a new exit conveniently located for passengers leaving end cars of trains to eliminate long walks through station; and all-new lighting throughout the station area. The station train floor will also be modernized. Another part of the project is construction of a new five-track bridge across Liberty and Penn avenues.

News Briefs in Pictures . . .

CELEBRATING 30 consecutive AREA conventions at the Palmer House in Chicago, the hotel presented a cake to the Association at a meeting of the Board of Direction in March. From left to right are: W. J. Hedley, vice-president; G. W. Miller, retiring president; J. R. Heimbaugh, hotel sales manager; and G. M. O'Rourke, new president.



UNDERFLOOR ducts for combination heating and cooling system in the Burlington's new Quincy, Ill., passenger station are of J-M Transite pipe.

WHAT'S THE ANSWER? . . .

. . . a forum on track, bridge, building and water service problems

Repairing Girder and Floorbeam Flanges

What is the most economical and effective method of reinforcing the upper flanges of floorbeams and girders that have been reduced in effective area by brine action? Explain.

Prevention Cheaper Than Repair

By E. S. Birkenwald
Engineer of Bridges, Southern, Cincinnati, Ohio

The method of reinforcement of the upper flanges of floorbeams and girders that have been reduced in effective area by brine action is dependent on the loss of section in the member and the density of traffic over the bridge. It is doubtful if any one method is more economical and effective.

Since floorbeams usually do not have cover plates it is a simple matter to weld or rivet on a cover plate which will restore the effective area of a top flange that has been affected by brine action. If welding is employed, the plate used for strengthening should be narrower than the width of the top flange to permit down-welding. This is easier to do and will provide better weldments, since there will be less slag inclusion.

It may be possible, if there is enough time between the passage of trains, to cut out the corroded portion of the flange angle and replace it with new material butt-welded into place.

If the floorbeam has cover plates, it may be cheaper to replace the top cover plate which will be the one most affected by corrosion. This involves knocking out the top-flange rivets; replacing them with erection bolts, removing these bolts and the plate between trains, as well as installing the new plate and bolting up; and finally replacing the erection bolts with rivets. If there is sufficient strength in the floorbeam without the top cover plate to carry live load, or if there is sufficient interval between trains, it may be possible to eliminate some of the steps in making the replacement. The use of high-strength bolts instead of rivets should save time in making this kind of reinforcement and should simplify the procedure to be followed.

The reinforcement of the upper flanges of girders may require somewhat different treatment. Girders built under modern specifications will undoubtedly have cover plates. If these plates are corroded it is possible to replace them under traffic, but that is the hard way to do it. If there are enough duplicate spans in the bridge it is possible to install one new span; repair the removed span on the bank; install it in place of another span with corroded top flanges; and keep repeating this process until the entire bridge is repaired. The cost of a new span may be paid for several times over by doing the work on the bank, free from the interference of traffic. It is not likely that top-flange cover plates on girders will be replaced unless the amount of corrosion has been permitted to reduce the capacity of the girder beyond the safe limits of overstress.

Some girders of older design have only partial cover plates. Where the exposed top-flange angles of such girders are corroded, it is possible to reinforce them by the same methods used for repairing floorbeams.

Usually tower spans of viaducts do not have cover plates.

It should be obvious that covering upper flanges of floorbeams and girders with a petrolatum containing an inhibitor to prevent corrosion is cheaper in the long run than having to reinforce for loss of section. It goes without saying that an ounce of prevention is worth a pound of cure.

Two Groups of Repairs

By G. G. Thomas
Engineer of Bridges, Atlantic Coast Line, Wilmington, N. C.

The restoration of the section of the top flanges of deck girders and of stringers supporting open decks

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Answers to the following questions are solicited from readers. They should be addressed to the What's the Answer editor, Railway Track and Structures, 79 W. Monroe St., Chicago 3, and reach him at least five (5) weeks in advance of the publication date (the first of the month) of the issue in which they are to appear. An honorarium will be given for each published answer on the basis of its substance and length. Answers will appear with or without the name and title of the author, as may be requested. The editor will also welcome any questions which you may wish to have discussed.

To Be Answered In the August Issue

1. What is the best time of year to apply treatment for the elimination of soft sports in the roadbed? Why? Explain.

2. When trucks are being spotted at the loading or unloading docks of freight houses, articles projecting from trucks sometimes damage the freight-house doors. What are the most effective methods of preventing such damage? Explain.

3. What causes the wing rails of spring frogs to open during warm weather? How can this tendency be overcome? Explain.

4. What are the most effective methods of stopping or preventing the leakage of water from the roadbed through the barrel of a concrete or masonry arch? Explain.

5. When spot surfacing track, is it good practice to raise the joints higher than the adjoining rail? Why? If so, how much? Explain.

6. Under what circumstances is it more economical or desirable to secure water for railway use from a municipal rather than from an independent source, such as a well or stream? Why? Explain.

and the same general type of work on the top flanges of floorbeams is a very active item of current repair work on the steel railway structures of the Atlantic Coast Line. This type of repair is necessary mainly on account of reduction of section due to brine action. These restorations fall into two groups: (1) The repair of girders and stringers; and (2) the repair of floorbeams.

In the repair of girders and stringers, restoration resolves itself into four problems. These are:

(a) Replacement of cover plates. This usually occurs where there are one, two or more plates which require, for each plate, partial or total removal, replacement and reriveting.

(b) Replacement of angles. This usually occurs in short girder spans. Where both legs of the angles are reduced it is generally more economical to lay out new angles and then, between trains, strip off the old angles and set in the new angles and rivet them to the web. Where the out-legs of the flanges are reduced, it is sometimes feasible to burn off these legs, plus a strip of web. Then set in a plate of a size required to replace the burned-off legs, and weld this new plate into place.

(c) Replacement of both cover plates and angles. This often requires the removal of the span from the track and replacement with a temporary span. The necessary repairs are then made without traffic interference.

(d) Renewal of flange rivets. It is not uncommon to find the flanges effective, but the rivet heads above the top of the cover plates reduced to the extent that redriving is required. Such redriving can be accomplished with comparative speed and economy when compared to (a), (b) and (c) above.

Floorbeams are quite generally affected by loss of top-flange section for a distance of about 12 in, more or less, on each side of each rail. This is due to the concentrated effect of brine drippings. The section affected is in the compression flange of the floorbeam. In such cases it is often practical to cut out short sections of top flange angle or top cover plate, then "jump-in" a plate and weld it in place to replace these cut-out posts.

Reduction of flange angles and cover plates of floorbeams can also be restored by laying on new full-length plates between the end supports of the floorbeams and welding these new plates to the tops of the existing angles or cover plate. This method is desirable where it will serve because it does not disturb the flange angles and further it allows the new plate to be down-welded. This expedient is practical only when the original top-flange material provides good sound metal at least one inch wider than the reinforcing material. This gives room for a good weld bead on each edge of the new plate.

The economical use of any of the above methods of repair is dependent on the employment of a force organized around an experienced foreman, a nucleus of experienced bridgemen and the necessary air and welding equipment.

The Line Side of Track

How can one determine which side of the track should be designated as the line side? Does it make any difference whether the line is single or multiple track? Why? Explain.

Uniformity, an Aid to Neatness

By J. T. Shepherd, Jr.,
Roadmaster, Norfolk & Western, Buena Vista, Va.

Determining the line side of a track is a matter not generally given the consideration it deserves. There are several reasons for a thorough understanding of this matter.

(1) It is a matter of neatness, or good housekeeping.
(2) It conforms to a standard set for the type of track concerned.
(3) It satisfies a desire for uniformity.
(4) It enables a relief foreman or new supervisor to work readily and intelligently without asking, "Which is the line side here?"

Standard track ties vary in length by several inches. For the sake of neatness the ends of the ties should line up perfectly on the line side. On our railroad the ties are scored with a straight mark near the holes bored for spikes. This enables the foreman readily to determine the line end of the tie. The bored holes also fall in place perfectly for both rails when the tie is properly placed and the tie ends on the line side are all in a pleasing line. The "ragged" ends are all on the side opposite the line side. This makes for neatness of appearance and uniformity.

On most of our main track the line side was determined many years ago as the east side or the west side. In my district, which is a north-south district, the line side has always been on the west side, except where we have double track or passing sidings, and the foreman, whether regular or relief man, always lines track on the west rail in single-track territory. In the event of double track the line side is always on the outside. With such an arrangement, uneven tie ends come within what is commonly called the "six foot" or intertrack space, which presents a neater appearance.

Following the above procedure, with the line side on the west side of a northward single track, any new spur track installed to the east of the main line and running eastward would of course have the line side on the north side, and by the same token a track turning out of main track and running westward would have the line side on the south side.

With the line side properly determined and maintained to good line at all times, adequate use of the track gage results in a pleasing appearance which will stand the test of the Gyroscope car.

Switches to Low Rail on Curves

By H. S. Chandler
General Supervisor of Track, Chesapeake & Ohio, Richmond, Va.

On single track on our railroad we use the south side as the line side of track, but in every case we switch our line side to the low or inside rail of curves. This, we think, affords a better and more even bearing for the low side of curves.

On double track we use the outside as the line side, as it looks neater and provides a more even bearing on the field side. This is because it usually requires much more smoothing to keep track in true surface on the field side than it does on the center-ditch side.

This is standard on our railroad and we think it is a good practice. However, other railroads may use a different standard.

Designated in Book of Rules

By B. F. McDermott
Roadmaster, Chicago & North Western, Brookings, S. D.

To begin with there has to be a line rail; otherwise it would be impossible to maintain line with any degree of accuracy. On every railroad or on every district there is always one rail of tangent track that is known or considered the line rail. All lining of track is done by sighting along this rail. All gaging of the opposite rail is done from the line rail. As a general thing the book of rules or instructions issued by the engineering department designate which rail shall be used as the line rail. It is a hard and fast rule that the same rail be used as the line rail every time the track is lined. There is one exception however. On a curve the outer rail or high rail is always used as the line rail. The line rail is basically fundamental.

After a piece of track has been surfaced the lining is done by sighting over the line rail. After this rail is lined, as nearly perfect as possible, it will be found that the line on the opposite or gage rail is not nearly as good as that on the line rail. This condition when it exists is caused by irregularities in gage and is usually found in the joints. Any such irregularities can be straightened by regaging. The tightening of track bolts in angle bars at regular intervals prevents this condition from developing.

In the winter season, particularly in those northern states where the roadbed freezes solid and where the heaving of track from frost forces track out of line, it may become necessary to spike-line the line rail and then gage-line the opposite rail. However, this should not be done unless absolutely necessary as the same process will have to be repeated, in reverse, in the spring when the frost leaves the roadbed.

The maintenance of good line is of prime importance. Track that is out of line will not stay in surface. Likewise, track that is out of level will not stay in line. This also brings out the necessity for maintaining correct gage. To avoid unnecessary wear on rail it is necessary that gage be correctly maintained. Incorrect gage not only permits lateral thrusts of equipment, with subsequent unequal wear on the rail, but also brings on poor line which in turn leads to poor surface.

These same principles apply on multiple track as well as on single track.

Dating Nails on Treated Ties

To what extent is it advisable to use dating nails or other methods to mark the installation dates of crossties? Is there less need for keeping individual tie-life records in view of the almost universal use of treated ties? Why? Explain.

A Means for Hasty Analysis

By C. Miles Burpee
Secretary-Manager Service Bureau, American Wood Preservers' Association, Chicago

By reason of the relatively large amount of money spent annually for crossties and because of the many factors affecting their service life, it is desirable to maintain specific records of their treatment, installation, and service. The high standards established for crossties through the efforts of the American Railway Engineering Association and the American Wood Preservers' Association have been largely responsible for developing products of high quality. The best evidence in the world is that pressure-treated ties in our railways have attained an average service life of more than 33 years in track.

Branding the ends at the treating plant, in the course of machining prior to treatment, has much in its favor. Basically, it should at least identify the treating plant, the type of treatment, and the year treated. This branding establishes the beginning of a record that is bound to be important in the future.

Dating nails, in addition to the branding, are convenient for quick reference during track inspection. They provide a means for hasty analysis on the spot, but branding virtually establishes the beginning of the life history of the crosstie on the railway.

Dating Nails Helpful

By B. D. Howe
Chief Lumber Inspector, Louisville & Nashville, Louisville, Ky.

It is my thought that the relatively small cost of dating nails, driven in the top face of crossties at the time of their installation in track, can be justified.

Even though almost all ties installed today are treated, they are manufactured from various species of wood and the method of treatment and kind of preservative used may change over the years. The use of dating nails would be most helpful in determining which species of wood and kind of treatment will gives the best service life.

It has been argued that track forces arbitrarily replace ties containing dating nails regardless of their physical condition when their age equals their average expected life. There may be isolated cases where this is true but it is doubtful that many foremen would follow such a practice. However, I do believe a foreman will be more careful in his inspection of a tie for renewal when the nail indicates that it has not given the expected life.

Because of the varying age of the ties in well-maintained track, each individual tie should contain an appropriate nail.

Nails Helpful in Inspection

By D. L. Murray
Manager of Treating Plants, Santa Fe, Topeka, Kan.

Creosote used as a wood preservative in the treatment of track ties has proved efficient as protection against the reduction of tie life by decay. Through the use of creosote as a wood preservative, the service life of track ties has been increased from approximately 10 years (untreated) to better than 30 years when treated. The processing and treatment costs approximately $1.00 per tie.

From studies made in recent years it has been determined that only about 10 per cent of tie failures are caused by decay and 90 per cent of the failures are from causes other than decay. To enable us to overcome the causes of failure, it is necessary that we know specifically what caused the failure. Therefore, we inaugurated an inspection system whereby ties in track are inspected for physical condition. Where failure has developed, a record is made which reflects the cause of failure, and

from the information in these records we are attempting to overcome these various causes of failure.

We think that the determination of the cause of mechanical failure is as important as was the determination of the proper preservative to be used to prevent failure by decay. In determining the cause of failure in track, the dating nail is important as a time saver.

Ties are marked on the ends at the treating plants, prior to treatment, with symbols representing specie of wood, class of tie, type of treatment and year treated. It is estimated that this marking costs approximately ½ cent per tie. It is estimated that the dating nail inserted in the tie costs approximately ½ cent per nail. Our inspection costs average approximately 7 cents per tie marked for renewal.

When the inspector notices a questionable tie in track, his first source of information is the dating nail. This date, together with general information marked on the end of the tie concerning the type of treatment and specie of wood and the tie's general outward appearance, enables the inspector to determine and justify the need for a thorough examination of the tie. This results in the complete examination of a minimum number of ties.

The physical appearance of ties in track is generally dependent on their location or the type of transportation service where they are used.

This is because the drip from all types of locomotives, refrigerator cars, etc., affects the appearance of the tie in track. The resulting need for ready information as to the age of the tie is a concern of the maintenance engineer or maintenance department. So far the use of the dating nail is the most direct and economical source of data for this purpose.

Re-Use of Track Fastenings

What factors should govern the degree or extent of re-use of the principal types of track fastenings in the various classes of service—main line, secondary line, branch line or yard? Explain.

Re-Use as Much as Possible

By L. F. Racine
Chief Engineer, Chicago, Indianapolis & Louisville, Lafayette, Ind.

Simplification and reduction in the number of designs for track fastenings, coupled with research, has played an important part in the manufacture of such materials.

The rail joint, one of the weak points in the track structure, has been improved in design through tests conducted to determine its fatigue strength and the stresses in track bolts and spring washers. This same procedure of improving design through tests has also been applied to switches, frogs, guard rails, tie plates and track spikes. Thus, through the continual effort of the manufacturers and the railway organizations, stronger track fastenings have been furnished. Therefore, as a result of this improvement, all such material released from main track, including rail, should be carefully inspected and sorted for shipment to secondary and branch lines for re-use.

The lighter-weight materials, including rail, frogs, switches, guard rails and track fastenings are, of course, re-used in yard and industrial tracks. It has proved economical to inspect and sort carefully for re-use all such track material where considerable service life is found to remain.

Realizing that yard and terminal facilities are the "heart" of freight operations, and that any congestion seriously interferes with traffic and interrupts schedules, it is often advisable, therefore, to re-use secondhand track fastenings to improve such yards and terminals. This could not be accomplished if it were found necessary to await AFE authority for the purchase of new rail and fastenings.

Protection of Standby Pumps

When a pump is placed in service as a standby emergency unit, what steps should be taken to protect it against rust and corrosion? Explain.

Prevent Excessive Humidity

By Earle M. Enger
Supervisor of Bridges & Buildings, Chicago, St. Paul, Minneapolis & Omaha, St. Paul, Minn.

For the widest comprehensive consideration of this question the three most popular types of pumps must be considered. These are electrically driven, engine-driven and steam-driven pumps.

All three types have a common area subject to corrosion. This is the external surface of the housing of the pump and the driving machine. Corrosion on those surfaces can best be prevented by making sure that all packings and joints are leak tight so that no liquid is permitted to escape. The surfaces should be thoroughly cleaned and dried and then kept well painted with a good iron preservative paint. In the case of steam pumps it is also well to grease the exposed piston rod while it is standing by.

Structures in which standby pumps are housed should be well ventilated to prevent excessive humidity within the structure, due to condensation from interior pipes, and its resultant rusting action. Areas subject to severe winter weather present an added problem. The pumphouse must be heated to prevent freezing, if it is desired to keep water in the pump, or the system must be drained for protection. In the event the pump is protected by drainage all packing nuts or glands should be loosened to prevent the expansion of freezing packing from bursting the housing.

The interior or working parts of the pump pose quite another problem for the reason that they cannot be kept dry, or coated for protection. The most practical method of deterring rust or corrosion would be to see that all joints are kept tight to prevent leakage.

In the case of internal combustion engines it is well to pour a small amount of high-grade lubricant into the cylinder, or cylinders, and revolve the engine several times before it is set by, the purpose being to give the cylinder walls and pistons a protective coating. All bearings should be thoroughly lubricated and water-cooled

cylinder heads should either be drained or treated with a rust inhibitor.

Location Determines Extent

By H. M. Dick
Supervisor of Structures, Pennsylvania, Harrisburg, Pa.

The location of the pumps to be used as standby emergency units determines the extent to which it will be necessary to go to prevent rust and corrosion. If the pumphouse or well is well ventilated and heated to keep the place dry, the problem of protecting against rust and corrosion is very simple. When a pump is installed for standby service, a good coat of red lead and a couple of coats of good machinery paint or enamel applied to the pump and the piping will protect against corrosion and rust for a considerable time. Since the working parts of the pump are bronze or brass there is not much danger of any difficulty in keeping tion.
these parts in good working condi-

The pump, even in standby service, should be tested and run periodically. This will keep the packing glands from drying out and the impeller shaft from accumulating rust and corrosion.

Grouting Building Foundations

When masonry buildings show signs of settling because of unstable foundation conditions, to what extent can grouting be used to stop such settling? How should the grout be applied? Explain.

Foundation Character Determines

By L. P. Drew
Assistant Chief Engineer, Union Pacific, Omaha, Neb.

The character of the foundation under masonry buildings will determine to what extent grouting can be used to reduce or correct settlement.

Fine silts, soft clays and similar soils do not lend themselves readily to grouting operations, whereas the soils containing coarser grained materials such as sands and gravels are very easily solidified by grouting. The equipment best suited for this work consists of a mud jack or high-pressure grout pump, preferably reciprocating, so that the pressure can be readily regulated and controlled.

It is entirely possible and very practical to pump grout under building foundations and floors in such a manner that settlement will not only be stopped, but also so that the building will be restored to its original level.

In the case of floors, the grouting should be done through holes spaced from 6 to 12 ft apart, spread over the entire area. The grout should be pumped under carefully regulated pressure so that levels can be checked as grouting progresses and stopped when the floor has reached its original elevation.

For foundations, grout pipes should be inserted to a considerable depth so that grouting can be progressive from the bottom upward until the entire area has been solidified.

The grout used in operations of this type should contain a fine smooth sand, not a sharp sand as is required for concrete. It is also desirable to use some additive to increase the flowability of the grout.

Soil Investigation Essential

By B. W. R. Bjorklund
District Engineer, Northern Pacific, St. Paul, Minn.

Thorough investigation of the supporting soil is essential in order that the actual cause of the settlement may be determined. Such an investigation is also necessary to best determine the depth to which the grout points should be inserted.

We have an instance of settlement in a long freight house. This structure was built over 50 years ago on filled-in ground and was supported on two rows of piling under a 4-ft spread footing. Subsequently, the water table lowered and the filled-in ground settled. This created a 2-in void under the spread footings. As the piling deteriorated, settlement of the spread footing occurred. Our method of grouting, in this instance, consisted of injecting the points into the void area and pumping in a quantity of grout calculated to fill this void area. The points were inserted at 20-ft intervals along the building and the grout was allowed to set up overnight. The following day we injected as much grout as possible at mid-points between the previously injected grout. In filling the void we used a lean grout mixture; for example, one part cement to six parts, or even ten parts, sand. We feel that the load has been transferred from the nearly rotted off piling to the soil

In instances where there is a slow settlement of a building due to consolidation of the soil, we use a rich grout mixture and in most instances neat cement. Where voids are small we feel that neat cement will develop greater soil stability and it can be more easily injected. Further, there is less likelihood of plugging the grout line.

Where deep grouting is essential, we begin our work with short points and attempt to form a capstone which will act as a seal for further grouting. Subsequent drilling through the grouted strata then permits more deep-seated injections. We find that we have equal success with either the hydraulic or reciprocating type of grouting machine.

Grouting an Economic Solution

By W. G. Burres
Railway Representative, Structural & Railway Bureau, Portland Cement Association, Chicago

Recent recommendations of AREA committees have focused the attention of many railroad engineers on the importance and need for adequate soil investigations when planning foundations for new structures. However, problems arising from floor or foundation settlements in older structures have also indicated a need for some method of stabilization. One method, and perhaps the foremost, is by the use of cement grout injected under pressure into the foundation material. The grout, a mixture of portland cement, water and a filler material (sand, clay, etc.), occupies voids in the subsoil. This improves bearing capacity.

The success of foundation pressure grouting often is proportionate to the amount of investigation and planning done on a job before final grouting recommendations are made. To be sure, it is false economy to do extensive studies for small and unimportant projects, but at least the nature of the soils composing the foundation materials should be determined and an intelligent estimate made of the cause of settlement.

Building settlement may result from many conditions, but general causes include:

(1) Foundation placed on improperly consolidated fill material.

(2) Bearing capacity of soil overestimated.

(3) Inadequate footing design.

(4) Soil consolidation resulting from machinery vibrations.

Depending on the type of soil encountered, grouting can usually correct for most of these conditions. Settlement can be halted in most instances and under some circumstances, such as floor subsidence, a slab can be raised to its original elevation.

Grout is injected into the ground by either pneumatic or hydraulic pressure. Equipment is available to do a satisfactory job by either method, and selection is usually based on personal preference or on the experience of the grouting gang. The main difference is that the penumatic grouters inject the grout in individual shots or slugs at pressures of 50-70 psi, while in the hydraulic process grout movement is continuous and at a pressure dependent on the resistance to penetration encountered. Hydraulic pressures will build up very rapidly. Very high pressures are seldom required to grout soil.

Grouting is not difficult, but as is true in other fields, experience is important. The grout is pushed from a mixer into a grout hose by air or hydraulic pressure. The hose carries it to grout pipes or hollow points driven into the ground at specific locations. The depth to which the points are driven is determined by experience, previous investigations and footing depths. Often a change of only a few inches in the depth of a point will determine whether the grout is accepted or refused. A driving pattern for the points should be followed either along a line (as under a strip footing) or in a checkerboard (as under a floor slab). This assures a complete and adequate coverage. Grouting usually is continued at each point until there is grout refusal or until it breaks through in some fashion on the surface. If settlement is not halted or corrected after the first pass, it may be necessary to re-grout the area. Points in the second grouting should be spaced between previous drivings.

A method of measuring or observing floor or foundation movements should be established at the start of any project. This is to prevent any serious displacements and to curb possible slab blow-outs. Care should be taken to prevent the development of grout pools between the bottom of a slab and its supporting material. Sizable hydrostatic pressures can develop quickly, for even a 50-psi machine would cause an uplift of 3½ tons per square foot.

Although proper techniques are needed and precautions must be observed, cement grouting usually offers an economic solution to the difficult problem of foundation stabilization. In some instances grouting is the only answer to foundation settlements.

BOOK REVIEW

Handbook of Drainage and Construction Products. Published by Armco Drainage & Metal Products, Inc., Middletown, Ohio. 592 pages; 380 illustrations; 6 in. by 9 in. $5 Postpaid.

This new edition of a book that was first published a quarter of a century ago, under the title of **Handbook of Culvert and Drainage Practice**, is a comprehensive technical treatment of the design and engineering application of a number of widely used drainage and construction products.

Purpose of the book is to aid engineers in solving drainage and related engineering construction problems; also to enlighten students in practical modern drainage and other construction problems.

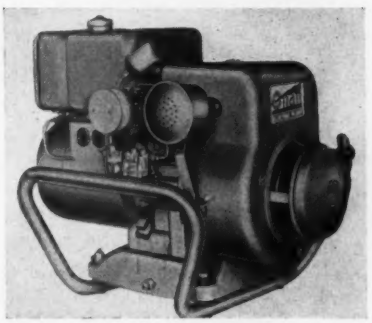
In 10 sections and 64 chapters it covers strength research; strength design; durability studies; durability design; economic factors; design principles and practice; subsurface drainage problems; miscellaneous problems; and installation instructions. In addition there is a section of conversion tables and general tables, an appendix summarizing research on underground conduits, and an index for quick and easy reference.

Section IX entitled "Miscellaneous Problems" is new to the book. A more thorough treatment is also given with respect to installation instructions for the various products. Railroad loading and gage tables are an additional feature. Each chapter is summarized at the beginning and each illustration is referred to in the text.

A typical section, "Design Principles and Practices," indicates the thoroughness of the work. The thirteen chapters of this section deal with hydrology; design of open channels; theory of critical flow; design of culverts or cross drains for size and shape; culvert location and length; highway surface drainage; railroad surface drainage, culverts under levees and dikes; and finish of culverts; design of sewers for size; hydraulics of sewers; sewer appurtenances; and part circle culverts.

PRODUCTS
OF MANUFACTURERS

New, improved equipment, materials, devices



ENGINE-DRIVEN ELECTRIC PLANTS

A NEW LINE of air-cooled, gasoline-operated electric plants which use a heavy-duty, 4-cycle gasoline engine, said to be specially designed for long-life generating plant service, comprise a new line of small engine-driven electric generating plants which has recently been announced by D. W. Onan & Sons, Inc., Minneapolis, Minn. This line ranges in capacity from 500 to 2500 watts. Series AK plants are available in sizes of 500 and 750 watts, 60-cycle ac. The AJ series include 1000 and 2500 watt, 60-cycle ac plants. Battery charging units are available in sizes ranging from 500 to 1500 watts dc.

It has been reported that, because of their small size and high output per pound of weight, these units are highly suitable for mobile and portable application on railroads and in heavy and light construction work where electric power must be supplied independently.

The Onan air-cooled, 4-cycle, single-cylinder gasoline engine powering the AK models has a 2½-in bore and stroke and delivers 1.85 hp at 1800 rpm. The similar engine which powers the AJ models has a 2¾-in bore with a 2½-in stroke and is rated 2.75 hp at 1800 rpm. However, this engine operating at 3600 rpm on the 2500-watt models is said to deliver 5 hp. The engines are equipped with rotating Stellite-faced exhaust valves and solid-Stellite exhaust seat inserts. They are

Before You Buy Just ANY Shovel Crane . . .

CHECK THESE 2 NEW BANTAMS!

You Get **MORE POWER . . . SMOOTHER PERFORMANCE . . .**

. . . ADVANCED ENGINEERING!

C-35A CRAWLER BANTAM is the lowest priced ⅜-yd. Crawler in the industry! Features 2-speed, independent travel; 94" overall width; low ground bearing pressure; 9 fast-change attachments!

T-35A CARRIER MOUNTED BANTAM — fast, efficient! Lifts 12,000 lbs.; works with 9 fast-change attachments. Complete line of BANTAM-BUILT Crane Carriers includes Model 100, All New 6 x 4; Model 200, 6 x 6; Model 300, Heavy-Duty 6 x 6 Carrier!

THERE'S A BIG DIFFERENCE IN THE NEW BANTAMS! . . . Compare BANTAM'S "Extra" features at NO "Extra" Cost!

- ★ **NEW** 2-Shoe Swing Clutch
- ★ **ANTI-FRICTION** Bearings
- ★ **POWER** Up & Down Boom Hoist
- ★ **NEW** Revolutionary Drive Tumblers
- ★ **NEW** Ball Bearing Bevel Gear Mounting
- ★ **NEW** Plate Lock
- ★ **NEW** Bull Ring Gear
- ★ **NEW** Vertical Drive Gear
- ★ **NEW** Trunnion Base Roller Path
- ★ **NEW** Heavy Duty Vertical Swing Shaft
- ★ **NEW** Stronger Travel Clutch Shaft

JOB-PROVED OVER 5800 BUILT AND SOLD

RT-9

CLIP . . . Mail TODAY for more information about the NEW BANTAMS

SCHIELD Bantam Co.

284 PARK ST., WAVERLY, IOWA, U. S. A.

Please send details on the

☐ Crawler mounted C-35A
☐ Carrier mounted T-35A
☐ Have representative call.

Name _____ Title _____

Company _____

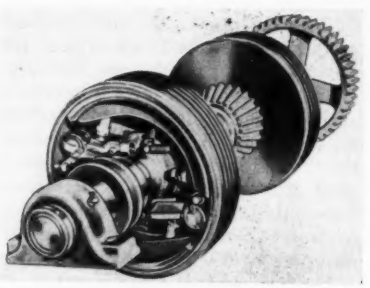
Address _____

City _____ State _____

New Products (Cont'd)

radio shielded and have high-tension magneto ignition, built-in governors and permanent-mesh air cleaners with oil-dipped packs.

The generators are of the revolving armature type, self-excited and have "inherent" frequency regulation of 3-cycle maximum. Optional accessories available include a carrying frame and 2-wheeled dolly.



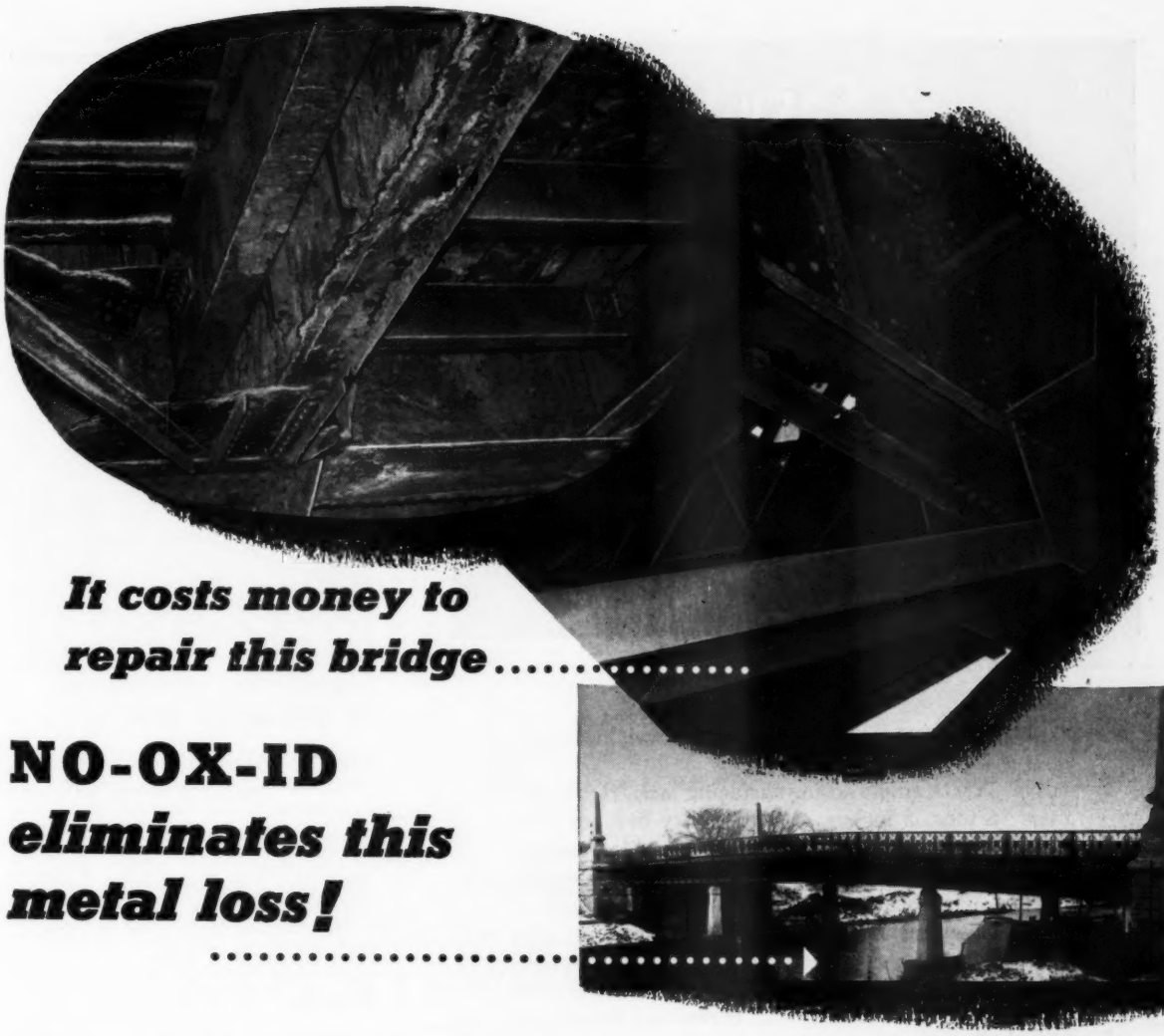
TWO-SHOE swing clutch for Schield Bantam units is reported to afford smoother clutch action, better lining and drum life and simpler adjustment.

IMPROVED LINE OF CRANE-EXCAVATORS

FIFTEEN major engineering improvements in its line of ⅝-cu yd, 5- and 6-ton truck and crawler-mounted crane-excavators have been announced by the Schield Bantam Company, Waverly, Iowa. Model designations of the machines incorporating the new improvements will be T-35A for the carrier-mounted, and C-35A for the crawler-mounted shovel-cranes.

Among the improvements are: A Continental F-26 6-cylinder gasoline engine as standard equipment; a new two-shoe swing-clutch design; a cast-steel drive tumbler to reduce cutting wear and abrasive damage to the track tumblers and shoes; use of higher carbon and alloy-content steel and a flame-hardening process to give greater parts life; and the addition of double-hook rollers as an optional feature.

Other new features include: A plate lock, enabling each lock-dog lever to be operated and locked independently; a ball-bearing mount for the bevel gear; anti-friction bearings for the shaft assembly; bolt-on crawler side frames; a chain-case brace; and replaceable tooth points for digging buckets.



It costs money to repair this bridge.....

NO-OX-ID *eliminates this metal loss!*

.....

Replacing rust-ruined steel bridge members is expensive...it's unnecessary, too! Because you can conserve vital materials and man-hours by preventing corrosion with NO-OX-ID Rust Preventives.

Wherever metal surfaces are exposed—on bridges, water tanks, structures, railroads—wherever steel is used, NO-OX-ID prevents rust with one coat. No expensive rescaffolding is required. Ask your Dearborn Engineer to recommend the NO-OX-ID combination best suited to solve your corrosion problems.

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Chicago 54, Illinois

Please send me NO-OX-ID bulletins on corrosion control.

Name.....*Title*.....

Railroad.....

Address.....

City.....*Zone*.....*State*.....

That's the story on Duff-Norton lightweight aluminum track jacks.

No. 517BA single acting surfacing jack (right) can raise 15 tons, 5 inches, and is twenty-five per cent lighter than a similar jack with a malleable housing. No. 117A single acting track jack (left) can move 15 tons, 13 inches and is thirty-three per cent lighter than its counterpart with a malleable housing.

Safe, rugged, dependable Duff-Norton aluminum track jacks soon pay for their slight additional cost by increased productivity . . . crews can keep pace with fast, modern maintenance equipment.

Get the complete specifications on these and other Duff-Norton track jacks. Write the world's oldest and largest manufacturer of lifting jacks for Track Jack Bulletin AD18-F, Duff-Norton Company, P. O. Box 1889, Pittsburgh 30, Pa. Canadian plant—Toronto 6, Ontario.

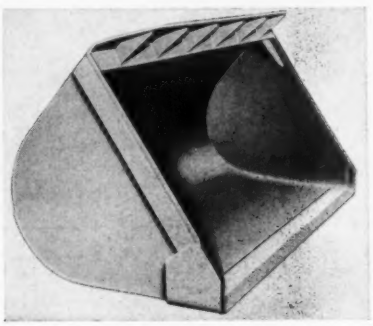
DUFF-NORTON

Jacks

"Giving Industry A Lift Since 1883"

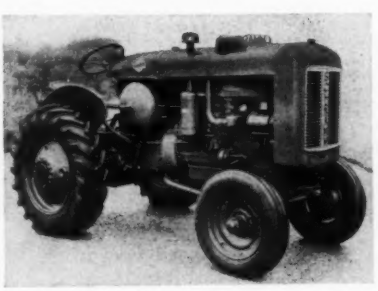
New Products (Cont'd)

Extensions are now available for the Model C-35 crawler-track frame; these can be added to the new bolt-on style crossbeams. Widths available are 15 ft 6 in (46-in extensions), and 11 ft 4 in (21-in extensions), when equipped with standard 16-in shoes.



TWO-POSITION BUCKET

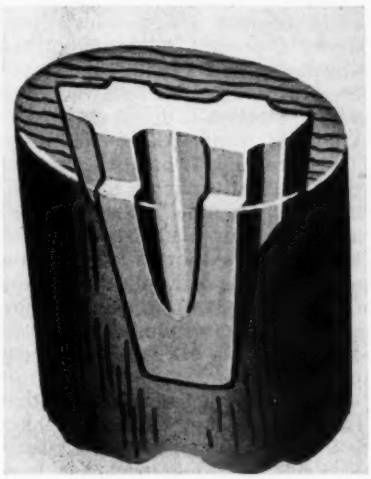
NOW AVAILABLE as an attachment for the Caterpillar No. 6 Traxcavator, is a new two-position, light-material bucket with a 3 cu yd capacity. According to the manufacturer, the Caterpillar Tractor Company, Peoria, Ill., the bucket is designed to handle more rapidly such products as coal, cinders, and other light materials weighing 2000 lb or less per cubic yard.



SELF-PROPELLED AIR COMPRESSOR

A NEW tractor-mounted air compressor, which has been named the Standard Pnuematractor, is being produced by Schramm, Inc., West Chester, Pa. This model has been designed to supply a tractor-mounted unit without facilities for mounting heavy-duty tractor accessories such as is provided by this manufacturer's Heavy Pneuma-

tractor. The new unit includes the same 125 cfm engine-compressor power plant used in the heavier machine which has been built into a self-propelled tractor unit that is designed to sell for less money than the large machine.



LOCK-TOOTH WEDGE

THE WARREN Tool Corporation, Warren, Ohio, has announced a new method of wedging wooden handles which are used on that company's line of Warren-Teed sledges and mauls. Designated the "Lock-Tooth," the new wedge features inverted bevel-cut teeth that bite into the wood after insertion. In addition to this locking action, the teeth are also reported to provide extra wood expansion, thereby resulting in a tight, secure handle fit. The "Lock-Tooth" is cast of non-corrosive aluminum alloy.

NON-SELECTIVE HERBICIDE

REPORTEDLY bringing a new chemical principal to vegetation control is a new non-selective herbicide announced by the Dow Chemical Company, Midland, Mich. Known as Baron, the new product is a liquid which is said to emulsify readily in water.

Active material in Baron is 2-(2, 4, 5-trichlorophenoxy) ethyl, 2, 2-dichloropropionate. For convenience this chemical has been given the coined common name "erbon." Baron contains 4 lb of technical erbon per gallon. The chemical may be sprayed on leaves, which take it up directly; or it may be sprayed on the soil, from which it is taken up

NEW Powerhouse on wheels!

Trailer-mounted 5 or 10KW

ONAN Electric Plant!

More plug-in power for construction work . . . higher mobility for emergency standby applications! On railroad construction jobs where highline power is not available, the Onan "CW" gives you abundant power for all your electric tools, equipment and lights. Now you can use one unit (in place of several smaller portable plants) reducing servicing time and maintenance costs.

Onan "CW" Electric Plants are unusually compact, quiet-running and economical to operate: weigh only half as much as water-cooled plants of the same capacity. Powered by Onan two-cylinder, suction-air-cooled gasoline engines built with massive, long-wearing parts for continuous, heavy-duty service. Fully-protected by heavy-gauge steel housing; stay on the job in any weather.

Wide range of accessories make the "CW" more versatile

You can equip your "CW" Electric Plants for any type of portable service with a wide range of accessories including skid, battery rack, 9-gallon fuel tank, weather-proof housing, two-wheel trailer, or 4-wheel, rubber-tired dolly. *Put one of these portable, high-capacity units on your job now!*

Onan builds electric plants for every need—400 to 100,000 watts

Write for folder A-362

Onan ELECTRIC PLANTS

D.W. ONAN & SONS INC.

3409 University Ave. S.E. • Minneapolis 14, Minnesota

"The most important thing I know about cranes is . . .

THIS ONE DOESN'T WEAR ME DOWN!"

Air-operated controls — and a crane that is always ready to go to work. Torque-Controls for smooth, accurate handling . . . and almost no clutch wear or adjustment. Short wheel base and only *six tires* so that it can turn and travel in any aisle big enough *for a truck.*

All ORTON cranes now have *Torque-Control*

- Locomotive Cranes — Catalog No. 84
- Aero (Rubber Tired) Cranes — Catalog No. 85
- Powermatic (Crawler) Cranes — Catalog No. 87

ORTON

CRANE & SHOVEL COMPANY
608 S. Dearborn St. • Chicago 5, Ill.

New Products (Cont'd)

by the roots. When applied to the soil it is said to act as a residual sterilant, lasting for approximately a full season, its effective persistence depending upon various factors.

The manufacturer states that Baron, applied to foliage, exhibits early contact action which produces a prompt reduction of the vegetation and defines the treated area. This action is followed by a systemic action which is claimed to kill most plant species effectively. Tests are said to have shown that the chemical is effective against almost all perennial grasses as well as herbaceous plants. Animal toxicity is reportedly very low. Recommended rates of application range from one to two pints per square rod, which corresponds to between 100 and 160 lb of erbon equivalent per acre.

The manufacturer claims that the erbon content in Baron makes it unique among weed-killers. Erbon is different in that it consists of a two-part molecule, both parts of which exert herbicidal action against their own range of vegetative types. Furthermore, the erbon molecule is reported to be considerably more active than either of its principal components.

ENGINE FEATURES DIRECT MOUNTING

A DIRECT mounting model of its K660 heavy-duty, two-cylinder opposed engine, designated the K660P, has been announced by The Kohler Company, Kohler, Wis. The new model is available with three different mounting pads and a variety of power take-off shafts. The new 225-lb unit has the following

HOW GOOD A SPOKESMAN ARE YOU FOR THE RAILROAD INDUSTRY?

HOW well can *you* represent your industry?

Do you know what's going on in other communities and other states on practices and rulings laid down by the I.C.C.? Do you know what's going on in Washington affecting your industry and your job? Do you know what's being done by your railroad and other railroads to better railway conditions? Are you aware of the treatment accorded your business and its competition?

Can you answer such questions — and know what you're talking about?

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Six members of *Railway Age's* 25-man editorial staff *work full time* to sift all the railway news, analyze and interpret it for you—and present it each week in concise, readable language. *Railway Age* maintains a complete editorial news staff in Washington, D. C., which constantly reports *all* developments in the Nation's Capitol of railroad significance.

Yes, the news pages in this publication are one of our many exclusive services to readers. And no effort is spared to give you *all the railway news* promptly and accurately week after week—and screened for you by *experienced* railroad reporters who know what is important and what isn't. This information, as retained by our readers in file form for reference, constitutes an authoritative chronicle of railway events, and developments in the making.

Join the thousands of railroaders all over the country who *know* what's going on in railroading—and who can speak on behalf of the industry as qualified representatives. Enter YOUR *Railway Age* subscription today!

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BALLAST CLEANING SERVICE

SPENO contract service eliminates capital investment by Railroads in this single-operation equipment.

SPENO'S double screening system gives a thorough cleaning in less time than a single screening by other mechanical means.

SPENO Ballast Cleaning Equipment does not foul train traffic on adjacent tracks.

SPENO'S record of high production and low cost can be verified by the sixteen Class I railroads now served.

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SAVE ON RAILS

BUY "GUARANTEED RELAYERS"

Handle more cars better — spend less to install and maintain with Relayers from Foster. "Open-stock" shipments from Foster warehouses, all sections 12# thru 175# — plus Switch Materials and Track Equipment items.

Send catalogs ☐ *Rails* ☐ *Track Equipment*
☐ *Send Free 'Track Maintenance' Book RT-5*

RAILS - TRACK EQUIPMENT - PIPE - PILING

L B FOSTER co.
PITTSBURGH 30 NEW YORK 7
CHICAGO 4 HOUSTON 2 LOS ANGELES 5

New Products (Cont'd)

dimensions: Length, 22½ in; width, 23⅜ in; height, 27 9/16 in. Power take-off shafts are available in lengths up to 6 9/16 in and the engine may be ordered with either a hand crank or an electric starter. The K660P is gasoline powered and air-cooled and is available with power units ranging from 15 hp at 1800 rpm to 26.8 hp at 3600 rpm.

PACKAGED CHIMNEY

A NEW RAIN CAP, preassembled as a unit to replace the former separate chimney pot, pegs, rain cap and housing cap used on the Van-Packer Packaged Masonry Safety Chimney has been introduced by the Van-Packer Corporation, Bettendorf, Iowa. The new unit includes a functionally designed cement-asbestos rain cap which is said to eliminate downdraft, a cement-asbestos rain-cap stand and a housing cap. It is now standard equipment with the deluxe model of the packaged chimney. The Van-Packer masonry chimney has been tested and listed by the Underwriter's Laboratories for all fuels—coal, oil and gas. It is said that it

can be specified wherever an 8 in by 12 in standard-code brick chimney may be used.

ELECTRIC STARTING FOR ENGINE

ELECTRIC starting for it's model K-160, 4-cycle, air-cooled, gasoline engine has been announced by the Kohler Company, Kohler, Wis.

GORMAN-RUPP PUMPS ARE BEST

Because they're

- THE SIMPLEST!
- QUICKEST PRIMING!
- FASTEST PUMPING!
- NEVER FAILING!

The greater capacity of Gorman-Rupp pumps when working against high heads is most important.

They have demonstrated their superiority on all kinds of tough pumping jobs the country over. They have no equal in the self-priming centrifugal field and will pump more water per gallon of fuel than any other comparable pump. Being practically trouble free they require a minimum of maintenance.

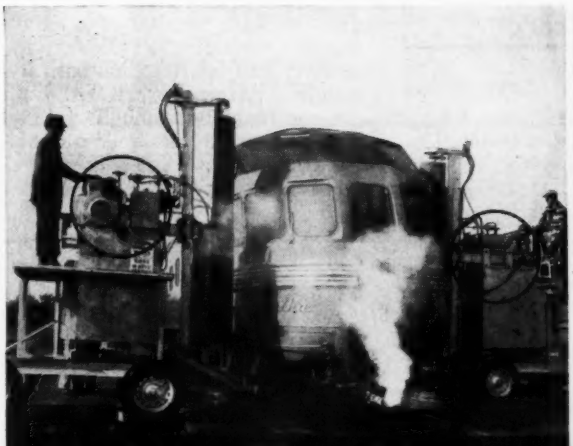
Gorman-Rupp pumps are available in all sizes from 1½", 5850 g.p.h. to 12", 240,000 g.p.h. Ask for Bulletin No. 8-CP-11.

Ask about the new Gorman-Rupp Diaphragm Pump with 400% more priming and diaphragm life increased 10 times compared with other diaphragms. Ask for Bulletin 4 DR-11.

THE GORMAN-RUPP COMPANY
MANSFIELD, OHIO

DO YOU KNOW RAILROAD TRACK?

Salaried position with a company manufacturing a rapidly growing product which cuts material and maintenance costs on tracks and bridges. A man with track supervisor's experience preferred. Engineering education would be desirable. Selling experience preferred, but interested in any man, who, if absolutely sure himself that the product would provide major savings and improvement feels that he could convince Chief Engineers and others that they should use it. There is one position to be filled in the Chicago area immediately, but would also be glad to hear from men who would be interested in such work in one or two years from now. Address Box 156, RAILWAY TRACK AND STRUCTURES, 30 Church St., New York 7, N.Y.



Washing Down Trains Takes *Dependable* POWER...

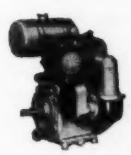
WISCONSIN HEAVY-DUTY *Air-Cooled* ENGINES

Two Wisconsin Heavy-Duty Air-Cooled Engines are at work here . . . powering two Wilson Train and Van Washers. Manufacturer of the effective, mobile washing unit is Ross and White Company, Chicago, Illinois.

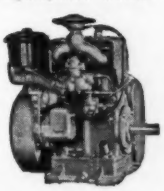
This interesting application is but one of many where Wisconsin Engines get the nod for power . . . the predominant 3 to 36 hp. power choice among railway maintenance equipment builders and buyers.

For example, Wisconsins power hydraulic spike pullers, track grinders, tie cutters, kribbers, motor cars, spray cars, multiple tampers, air compressors, many others. Why do they merit such confidence? You'll find the answer in the features. Each model has thrust-absorbing, tapered roller bearings at both ends of the crankshaft and fool-proof air-cooling in hottest summers, coldest winters. Also, each has an easily-serviced OUTSIDE magneto with impulse coupling for quickest starting and running in all climates *plus* heavy-duty construction throughout . . . *built* better to *work* better.

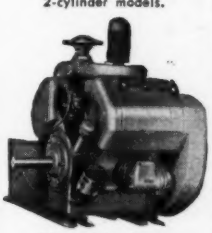
Write for details about all 4-cycle single-cylinder, 2-cylinder and V-type 4-cylinder models, 3 to 36 hp.



3 to 9 hp. single-cylinder models.



7 to 15 hp. 2-cylinder models.

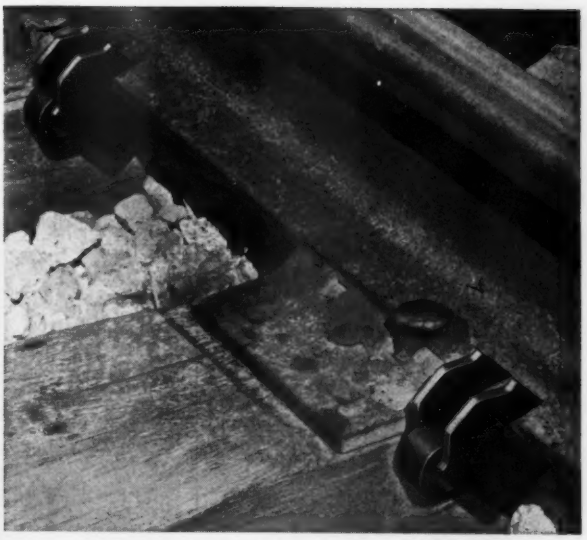


15 to 36 hp. V-type 4-cylinder models.

WISCONSIN MOTOR CORPORATION

World's Largest Builders of Heavy-Duty Air-Cooled Engines

MILWAUKEE 46, WISCONSIN



Tighter grip means better anti-creep protection

Specify double-jawed True Temper RAIL ANCHORS

● Only True Temper rail anchors have this double-jawed clamp that cannot slip . . . that's built to grip the rail at *two* points and hold it against creepage.

And True Temper rail anchors have a two-piece design (factory-assembled as a unit) . . . a design that permits better fulfillment of a rail anchor's function. First, the large clamp is designed to present maximum bearing surface against the tie. The clamp also contains the two jaws that grip the rail. The spring holds the clamp against the rail.

The result of this design is an anchor that holds better and is easier to install. There's less need for frequent inspection. There's less trouble with misalignment and creepage.

ADDITIONAL FEATURES

Apply with any standard striking tool
Not affected by frozen ballast
Greater protection in case of derailments
Impossible to overdrive
Better fit on worn or corroded rails
Easy and safe to re-install

TRUE TEMPER®

Railway Appliance Division • Cleveland, Ohio

TRUE TEMPER RAILWAY TOOLS

SYNTRON
POWER TOOLS

ELECTRIC HAMMERS and
"Self-Rotating
ELECTRIC HAMMER DRILLS
For fast, easy cutting, chipping or drilling in concrete

Belt-Driven
ELECTRIC SAWS
Cut wood, concrete block, plasterboard, etc., 2-13/16" and 3-1/4" cuts.

CONCRETE VIBRATORS
Pulsating Magnet types for forms. Electric motor or gasoline operated for mass work.

100% Self-Contained
GASOLINE HAMMER
Paving Breakers
•
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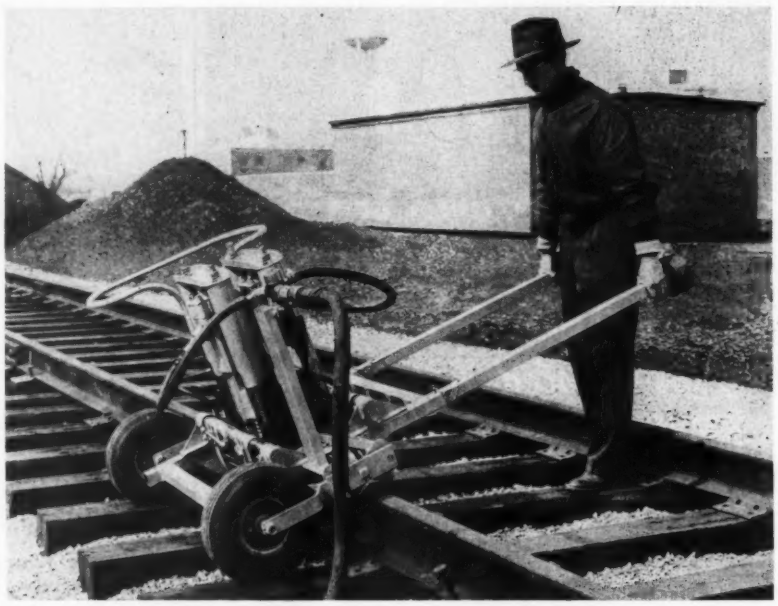
•
Spike Drivers
No air compressor needed to deliver 2000 powerful blows per minute.
Write today for illustrated Tool Catalogue - FREE.

SYNTRON COMPANY
290 Lexington Ave. Homer City, Pa.

New Products (Cont'd)

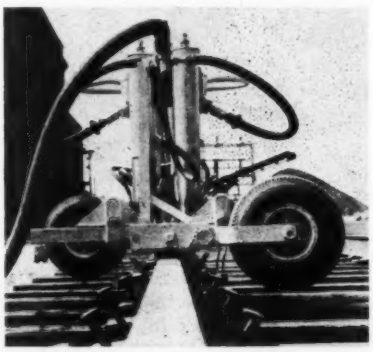
Designed the K160S, the 6.6-hp unit is equipped with a 6-volt electric starter and generator, ignition switch and starter button. The engine carries a number of standard features including a silencer-type muffler, ball bearings, oil-bath flyweight governor, oil-bath air cleaner, fuel filter, and a 1¼-gal fuel tank. A specially designed air-cooling system keeps the engine at correct temperature.



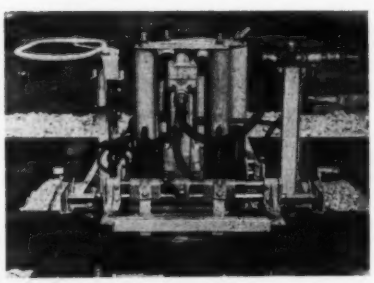
RUBBER-TIRED outrigger wheels aid in removing machine from track.

DUAL SPIKE DRIVER

A NEW MACHINE that drives two track spikes simultaneously has been announced by the Ramapo Ajax Division, American Brake Shoe Company, Chicago. In operation, one man on a spike carriage distributes the spikes directly from the keg by placing them loosely in the spike holes of the tie plate. The new driver, known as the Racor Dual Driver DD-4, which is operated by one man, positions the spikes automatically with the aid of two magnetized positioners which raise the spikes to a vertical position directly in line with two heavy-duty pneumatic hammers which are mounted on the machine. The exact positioning for driving is done by the operator who uses one spike as a guide. Operation of a single control handle then releases the two pneumatic hammers, thus driving the spikes. Release of the control handle returns the hammers to non-driving position for movement to the next set of spikes. The machine is equipped with two rubber-tired outrigger wheels which permit one man to remove it from

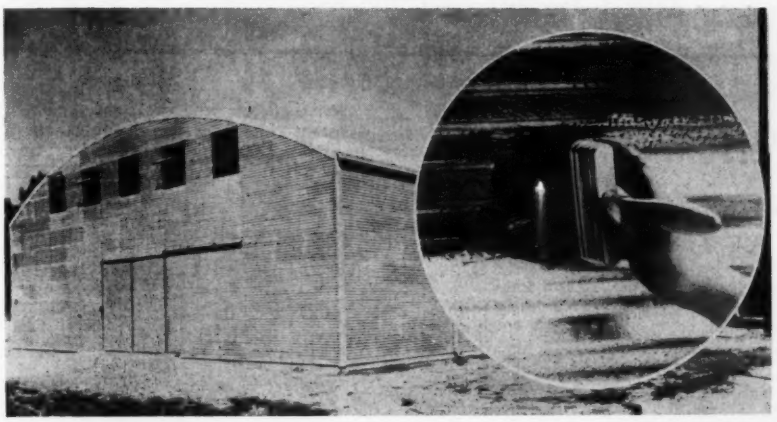


MAGNETIZED positioner straightens and positions spikes for . . .



SIMULTANEOUS driving with two heavy-duty pneumatic hammers.

the track easily, in wheelbarrow fashion. It is reported that the use of this machine will substantially reduce the number of men required for spiking operations. The manufacturer expects to have this machine in production in the very near future.



COATING FOR GALVANIZED SURFACES

A COATING compound, which is reported to be applicable to new or old galvanized metal surfaces without etching treatment, is now being offered by the Rust-Oleum Corporation, Evanston, Ill.

The new product is called Galvinoleum and is designed for application to new, old, previously painted, or partially rusted galvanized surfaces. It is available in a choice of red, gray, metallic or green color. According to the manufacturer, new galvanized surfaces need only be cleaned to remove grease or oil before coating with Galvinoleum. Old surfaces should be cleaned to remove dirt, grease and foreign matter, and partially-rusted surfaces should be scraped and wire brushed to remove rust scale and loose rust, then "spot-primed" with Galvinoleum No. 1225 Red. It is stated that if the surface has been previously painted, it is important to remove loose and flaking old paint prior to coating with Galvinoleum.

The product is supplied at brush consistency; however, it may be applied by spray after thinning 10 to 15 per cent with Rust-Oleum 540 Thinning Oil. Galvinoleum red and green are reported to dry to touch in four to eight hours, and the metallic and gray in eight to twelve hours.

SIX-BY-SIX CRANE CARRIER

THE SCHIELD Bantam Company Waverly, Iowa, is now offering a completely remanufactured six-by-six crane carrier for mounting of the Model T-35 Schield Bantam power crane-shovel. The new unit, known as the Bantam "200" Carrier, provides 6-wheel drive, and a 2-speed transmission offering 10 forward speeds, and two in reverse.

The machine is capable of operating at road speeds as high as 40 mph.

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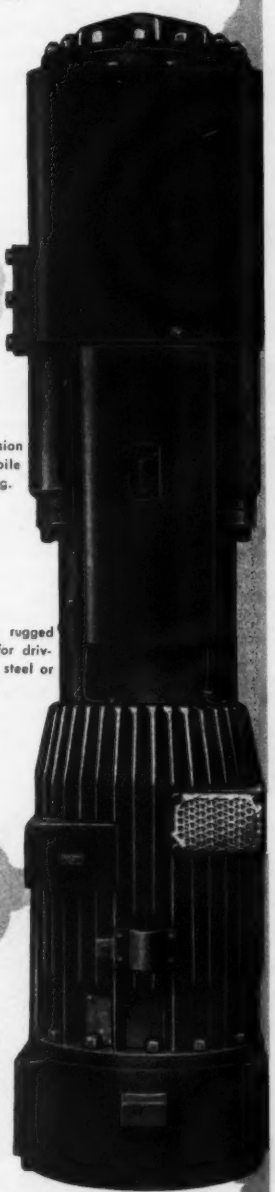
DIESEL PILE HAMMERS

"Self Contained"

Require No Boiler, Hose, Fireman or Compressor

Easily attached to swinging leads of diesel cranes.



Quick conversion of crane to mobile pile driving rig.

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In capacities from 5,000 to 20,000 ft. lbs. per blow.

Send for catalogue and specification data - FREE

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THE MONTH'S NEWS...

. . . among railway men—the associations—the suppliers

Changes in Railway Personnel

General

M. A. Niegro, chief land appraiser on the Seaboard Air Line, and an engineer through past training and experience, has been appointed real estate agent with headquarters at Norfolk, Va.

Charles B. Niehaus, land and tax agent for the Central of Georgia at Savannah, Ga., retired May 1 after more than 49 years of railroad service.

Born at Kansas City, Mo., he began his railroad career with the Missouri Pacific in 1906 and in 1907 joined the Kansas City Southern as a field draftsman and topographer. He began service with the C of Ga in June 1908 in the engineering department, and in August 1909 left to join the Illinois Central at Carbondale, Ill. He returned to the C of Ga in May 1910 as a draftsman, and was promoted to assistant engineer in 1911 and to real estate agent in 1916. He was appointed pilot engineer in 1917 and in 1918 became valuation and real estate engineer. He was named land and tax agent in 1926. Mr. Neihaus, is a member of the American Association of Engineers, the Fire Prevention Committee of the AAR, and is secretary of the Uniform Contract Committee of the AREA.

Felix S. Hales, executive vice president of the Nickel Plate, and formerly bridge engineer of that road, has been elected president, succeeding **L. L. White,** who

Felix S. Hales

will continue as chairman of the board and chief executive officer.

Mr. Hales joined the Nickel Plate in 1916 as a draftsman in the grade elimination department and served in that capacity until June 1918 when he was commissioned a 2nd Lieutenant in the U. S. Army. He returned to the Nickel Plate in December of the same year and successively became assistant to the corporate chief engineer, assistant engineer of bridge design and steel inspection, and engineer of track. Between 1929 and 1931 he was assigned to engineering duties in connection with the development of the Cleveland Union Terminal. He subsequently served as bridge engineer, assistant general superintendent and assistant to the president before being appointed vice president-operations in November 1947. Mr. Hales was born at Wilson, N. C., and received a Bachelor of Engineering degree from North Carolina State College in 1913 and a civil engineering degree from Cornell University in 1916.

Engineering

W. R. Benish, assistant division engineer on the New York Central at Weehawken, N. J., has been promoted to division engineer on the St. Lawrence, Adirondack and Ottawa division with headquarters at Watertown, N. Y. **T. Burrell, Jr.,** general track inspector at New York, has been named assistant division engineer on the Pennsylvania division with headquarters at Jersey Shore, Pa.

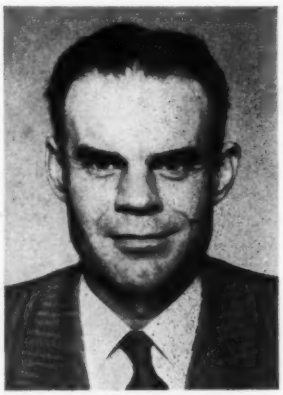
Lyle Bristow, who has been appointed assistant engineer maintenance of way on the New York Central at Cleveland, Ohio (*RT&S*, April, page 69), was born at Indianapolis, Ind., February 28, 1902. He attended Purdue University where he received a BS degree in civil engineering in 1926, following which he joined the Big Four as an assistant engineer at Galion, Ohio. After serving in this capacity at various locations on the road, Br. Bristow was appointed track supervisor at Harrisburg, Ill., in July 1940. He subsequently served at track supervisor at Paris, Ill., and Middletown, Ohio until his entrance into the Military Railway Service in December 1942. He returned to the Big Four as track supervisor at Middletown in October 1945, and was appointed assistant engineer at Dayton the following month. He was appointed office engineer at Springfield, Ohio, in July 1946, and was named assistant division engineer at that same point in September 1947. He became division engineer at Mattoon, Ill., in July 1952, and later served as division engineer at Springfield.

R. C. Nissen, who has been appointed assistant chief engineer on the Southern Pacific at San Francisco (*RT&S*, April page 58), was born at Ferndale, Cal.,

R. C. Nissen

July 12, 1902. He is a 1925 graduate of the University of California, and began his railroad service with the SP in December 1925. After serving as a draftsman in various grades in the engineering office in San Francisco, Mr. Nissen was appointed assistant to chief engineer in February 1944, the position he was holding at the time of his recent promotion.

N. W. Kopp, who has been appointed principal assistant engineer on the Illinois Central at Chicago (*RT&S*, April, page 58), was born at Lismore, Minn.,



N. W. Kopp

September 30, 1917. He attended the University of Iowa where he received a BS degree in civil engineering in 1939, and began his railroad service with the Illinois Central as a chainman at Memphis, Tenn., in January 1940. In August of that same year he was advanced to rodman and served in this capacity until being promoted to as-

Today this No. 12 is building a firebreak— Tomorrow it may be...

SHAPING EMBANKMENT

ELIMINATING IRREGULAR FILLS

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THE Caterpillar No. 12 Motor Grader is an all-around machine ready to tackle almost any off-track railroad job . . . and stay on the job until it's completed.

Here it's grading 4½ miles of firebreak for the Northwestern Pacific Railroad near Willits, Calif. When finished, the road will provide quick access in case of fire or other emergency in the area.

But that is today's job for the CAT* No. 12 Motor Grader. Tomorrow this versatile machine could be doing any number of jobs. It is indispensable for putting in good drainage, or controlling weeds and brush. In the snow country, they like it for widening clearance.

And now it does all of its many jobs *even better!* For the new No. 12 packs more power, 115 HP, and has faster reverse speeds. And the capacity of the transmission and clutch has been increased to match the greater horsepower. In addition, the No. 12 and the No. 112 have simplified starting from the seat and a foot-operated accelerator-decelerator which permits changing speeds without affecting hand-throttle setting.

Your Caterpillar Dealer would like to demonstrate these new motor graders on *your* job. Seeing them in action you'll understand how these versatile machines now can give you even more work at lower cost.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

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sistant supervisor of track on the Mississippi division in October 1942. He was promoted to supervisor of track on the same division in July 1944 and was appointed assistant engineer in the bridge department in Chicago in January 1946. He was named assistant engineer in the office of the vice-president and chief engineer at Chicago in December 1946, and was advanced to assistant engineer of design in that same office in August 1948. He was promoted to engineer of design in August 1949 and held this position until being appointed division engineer on the Mississippi division in April 1950.

N. R. Forbes, whose promotion to division engineer on the Illinois Central at Memphis, Tenn., was announced recently (*RT&S*, April, page 58), was born November 27, 1918, at Walnut, Iowa. He attended the University of Iowa from 1935 to 1940, and began his railroad service with the IC as a chainman at Vicksburg, Miss., in April 1940. He was advanced to rodman at that same point in April 1941, serving in that

N. R. Forbes

capacity until his entrance in the military service in August of that year. He returned to the IC as a rodman at Vicksburg in October 1945, and was advanced to instrumentman at McComb, Miss., in November 1945. In August 1947 he was advanced to assistant supervisor at that same point, then was promoted to track supervisor at Mendenhall, Miss., in November 1948. He later served in that same capacity at McComb and Corinth, Miss., until his appointment as assistant to division engineer at Memphis in May 1952.

C. K. Lucas, assistant chief engineer of the Clinchfield, has retired. **J. A. Goforth** has been appointed to the newly created position of maintenance engineer with headquarters at Erwin, Tenn. **L. C. Kerns** has been named senior assistant engineer, also a new position, with headquarters at Erwin.

J. B. Link and **R. W. Schmidt** have been appointed assistant engineers on the Central of Georgia. Both men will make their headquarters at Savannah, Ga.

J. A. Holmes, who has been named assistant to chief engineer on the Southern Pacific at San Francisco (*RT&S*, April, page 58), was born at

J. A. Holmes

Portland, Ore., August 5, 1911. He received a BS degree in civil engineering from Oregon State College in 1935 and began his railroad service with the SP in June 1936 as a rodman on the Portland division. Between January 1937 and November 1940, Mr. Holmes served successively as a draftsman, transitman and engineer inspector on the Portland division. In November 1940, he was named assistant engineer and served in this capacity until December 1941 when he entered service with the U. S. Army. He returned to the SP as assistant engineer in October 1945, and in May 1948 was advanced to assistant construction engineer in the chief engineer's office at San Francisco. He was promoted to construction engineer in January 1952.

W. A. Hansen, whose promotion to assistant to chief engineer on the Denver & Rio Grande Western at Denver, Colo., was announced recently (*RT&S*, April page 62), was born at Milwaukee, Wis., March 21, 1902. He began his railroad service with the Chicago & North Western in the accounting department in 1923. In 1928 he joined the Burlington as a division accountant at Ottumwa, Iowa, later serving as assistant engineer at Chicago. In 1934 he joined the Rio Grande as a special accountant and engineer at Denver. He was appointed valuation accountant in 1947 and chief clerk to chief engineer in 1949.

W. E. Kiley, whose promotion to assistant division engineer on the Boston & Maine at Greenfield, Mass., was announced recently (*RT&S*, April, page 58), was born at Swampscott, Mass., December 10, 1920. He attended Cornell University and began his railroad service with the Boston & Maine in July 1948 as a student supervisor at Boston. He was advanced to assistant bridge and building supervisor at that point in August 1949, and in April 1952 was named assistant track supervisor in Boston. He later served in this capacity at Concord, N. H., until December 1953, when he was appointed assistant bridge and building supervisor at that same point. He was advanced to track supervisor at Boston in January 1954.

B. J. Gordon has been appointed assistant division engineer on the Ohio Central division of the New York Central, with headquarters at Columbus, Ohio, succeeding **John Stang,** who has been transferred.

W. M. Hager, assistant valuation engineer on the Southern at Washington, D. C., has been promoted to valuation engineer with headquarters at that same point.

J. T. Hiner, assistant division engineer on the Southern at Atlanta, Ga., has been advanced to division engineer at Bristol, Va. **J. H. Hall,** bridge and building supervisor at Valdosta, Ga., has been promoted to assistant division engineer at Atlanta, succeeding Mr. Hiner.

B. E. Pearson, acting supervising engineer on the Duluth, South Shore & Atlantic at Marquette, Mich., has been promoted to chief engineer at the same point, succeeding **S. P. Berg,** whose resignation was announced in *RT&S*, November 1954.

Track

D. L. Walker, assistant roadmaster on the Frisco at Sherman, Tex., has been transferred to the Thirtieth track division with headquarters at Tulsa, Okla.

C. E. Hutchinson has been appointed assistant supervisor of track on the Pennsylvania at Canton, Ohio, succeeding **C. L. Tracy**, who has resigned.

H. C. Windham, Jr., apprentice track supervisor on the Central of Georgia, has been promoted to track supervisor at Sylacauga, Ala., succeeding **Ferrell Dodgen**, whose promotion to division engineer was announced in the March issue of *RT&S*, page 196.

P. K. Cruckshank has been appointed general track inspector on the New York Central with headquarters at New York City, succeeding **T. Burrell, Jr.,** whose promotion to assistant division engineer is noted elsewhere in these columns.

W. C. Wieters, whose promotion to supervisor of track on the Pennsylvania-Reading Seashore Lines at Tuckahoe, N. J., was announced recently (*RT&S*, April, page 68), was born at Des Moines, Iowa, December 19, 1926. He attended Iowa State College where he received a BS degree in civil engineering in June 1950. He began his railroad service with the PRR as a junior engineer at Union City, Ind., following graduation. He subsequently served in this same capacity at Marion, Ind., and Terre Haute, until being appointed assistant supervisor of track (branch line) at Enola, Pa., in December 1951. He was appointed assistant supervisor of track (main line) at Philadelphia in September 1952.

B. E. Cors, whose promotion to roadmaster on the Burlington at Beardstown, Ill., was announced recently .(*RT&S*, April, page 68), was born in Lafayette, Ind., August 26, 1922. He attended Purdue University and began his railroad service with the Burlington in September 1947 as a rodman. He later served as a blueprinter and again as a rodman be-

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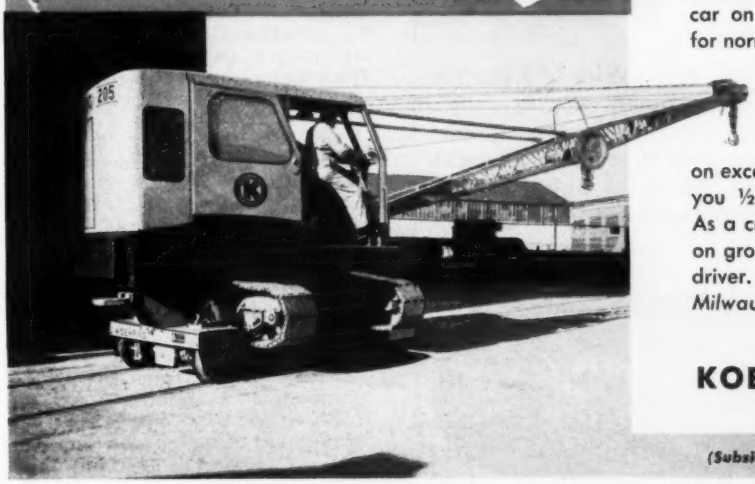

With Koehring 205 RailAid, it's not necessary to move off-track over round-about routes from one work section to the next. Self-powered RailAid travels on-track at speeds up to 20 m.p.h. . . . does 2 to 3 times the work of conventional excavators and cranes that have to crawl or be hauled from job to job.

You can send RailAid anywhere along the line at a moment's notice to do any digging, lifting or material-handling. It works on or off-track . . . cleans ditches, widens embankments, stock-piles coal or ballast, loads and unloads cars, repairs trestles, lays rails, does pile-driving, handles scrap or salvage.

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Railway Personnel (Cont'd)

fore being appointed assistant extra gang foreman in August 1948. He was promoted to section and extra gang foreman in January 1949 and served in these capacities until June 1952 when he was appointed track supervisor, the position he was holding at the time of his recent promotion.

A. V. Levergood, Jr., who has been promoted to supervisor of track on the Pennsylvania at Salisbury, Md. (*RT&S*, April, page 68), was born at Yeadon, Pa., November 22, 1927. He attended the University of Pennsylvania and began his railroad service with the PRR in July 1949 as a junior engineer of track at Holmstead, Pa. He later served in the same capacity at Pittsburgh, Pa., New assistant supervisor of track at North-Castle and Trafford. He was appointed assistant supervisor of track at Northumberland, Pa., December 1951, and subsequently served in the same capacity at Pittsburgh.

C. L. Connor, track supervisor on the Erie at Avon, N. Y., has retired after more than 42 years of service. The position of track supervisor at Avon, formerly held by Mr. Connor, has been abolished. The territory has been split up and will, henceforth, come under the jurisdiction of **F. L. Morris**, track supervisor at Hornell, N. Y., and **J. Krizman**, track supervisor at Warsaw, N. Y. **A. P. Buono** has been appointed general foreman, Buffalo division, with headquarters at Buffalo, N. Y., succeeding **C. F. Young**, deceased.

J. B. Mallory, Jr., has been appointed track supervisor on the Southern at Orangeburg, S. C., succeeding **H. H. Bradley**, whose appointment as bridge and building supervisor is noted elsewhere in these columns. **C. M. Lumpkin** has been named assistant track supervisor at Eutaw, Ala.

Bridge and Building

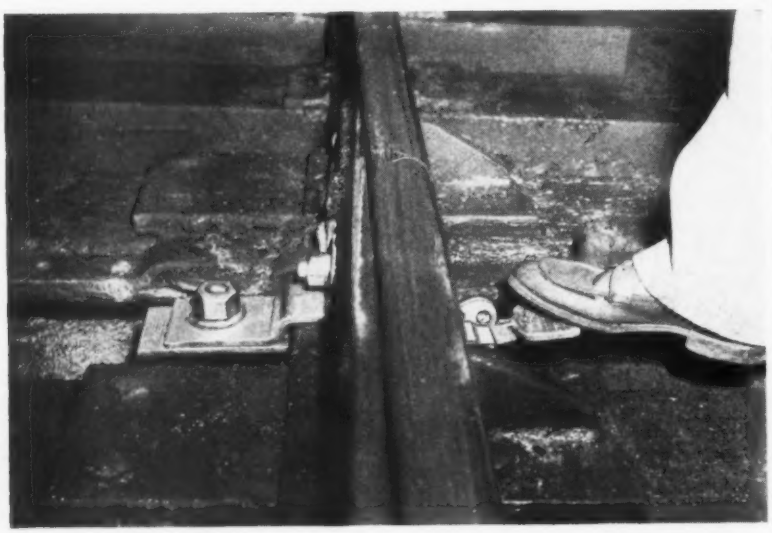
M. A. Beringer, bridge inspector on the Illinois Central, has been named superintendent of bridge erection at Chicago, succeeding **F. E. Taggert**, who has retired.

H. H. Bradley, track supervisor on the Southern at Orangeburg, S. C. has been appointed bridge and building supervisor at Valdosta, Ga., succeeding **J. H. Hall**, whose promotion to assistant division engineer is noted elsewhere in these columns.

Obituary

I. H. Schram, retired chief engineer of the Erie, died January 28 at his home in Cleveland, Ohio.

J. W. Hopkins, engineer of track of the Bessemer & Lake Erie, with headquarters at Greenville, Pa., died suddenly on April 4 at Birmingham, Ala., while attending a meeting there.



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Association News

Associated Railway Track Contractors

Donald Charlton, executive vice-president, T. F. Scholes, Inc., Reading, Pa., was elected to a second term as president of the Associated Railway Track Contractors of America, Inc., at the group's annual meeting in Chicago during March.

Also re-elected were J. B. Badger, Stevens Construction Company, Cleveland, first vice-president; E. D. Pearson, Pearson Company, Inc., Brookline, Mass., second vice-president; and John Deckert, The Deckert Corporation, Chicago, secretary-treasurer. Named to the board of directors were the four officers and Lou Franco, Mannix, Ltd., Calgary, Alta.

At the annual meeting, Mr. Charlton announced that the present international agreements of the association with the Hod Carriers and Common Laborers (AFofL) and the Operating Engineers

(*Continued on page* 70)

Reduce accidents with reflectorized signs

Assure positive warning . . . fair weather or foul . . . with signs of "SCOTCHLITE" Reflective Sheeting

Now! Your railroad can increase safety on the right-of-way . . . both night *and* day. Signs of Wide Angle Flat-Top "Scotchlite" Reflective Sheeting are visible at night up to ½ mile . . . are distinct and clear by day. These signs prevent accidents, protect property through more efficient train control. Signs of "Scotchlite" Sheeting are *economical*. You can reflectorize your system with signs from your *own* sign shop!

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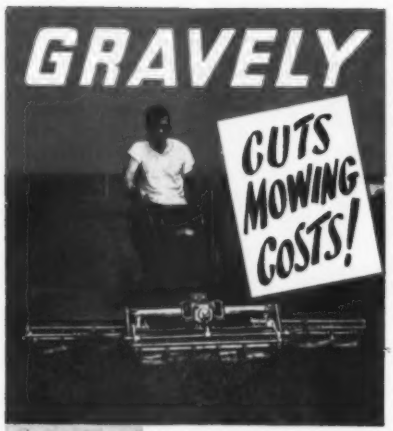

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3 SNOW REMOVAL TOOLS afford YEAR-ROUND USE, in every season — an example of Gravely's versatility.

MORE for your MONEY!

5-HP — more than twice the power of the usual power mower . . all-gear drive, two speeds forward and REVERSE . . . 21 tools available!

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Send for 24-page Booklet, "Power vs Drudgery", that shows you how and why you get more for your money when you get Gravely.

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WE OFFER PROOF by on-the-job demonstration. Just write for literature or FREE Demonstration today!

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Manufacturers' Literature

Following is a compilation of free literature, pamphlets and data sheets offered by manufacturers to the railroad industry. Circle the number(s) on the coupon below to receive the desired information; the requests will be sent direct by the manufacturers.

1. CATERPILLAR SERVICE. *Caterpillar Tractor Co.* 8-page booklet "Your Job . . . Your Equipment . . . and Caterpillar Service" discusses Caterpillar service facilities with factory-trained servicemen, modern equipment and time-saving power tools.

2. STEEL BUILDINGS. *Armco Drainage & Metal Products, Inc.* 24-page manual (SX-2054) "Armco Steel Buildings Series S" describes and illustrates Armco Series S, Types 1, 2, and 3 buildings, multiple-span buildings, lean-to units, and their accessories; includes erection and finishing instructions; photos show various uses.

3. BLADES. *International Harvester Co.* 24-page 2-color profusely illustrated booklet (CR-598-D) gives complete data and specifications on International Bullgrader and Bulldozer Blades for International Crawlers; includes on-the-job photos.

4. MANGANESE STEEL WELDMENTS. *American Manganese Steel Div. Amer. Brake Shoe Co.* 16-page guidebook (WA-77) "Add New Life to Worn Equipment With Amsco Manganese Steel Weldments" designed to aid power shovel users in picking right repointer style for dipper teeth; includes step-by-step procedure on successful repointing.

5. LINER PLATES. *Armco Drainage & Metal Products, Inc.* 4-page folder (TL-10154) "Tunnels do it Better" describes speed of installation with Armco liner plates, low cost, use of simple tools, strength of plates, applications, and includes detailed drawings and physical properties.

6. AIR DISTRIBUTION. *Barber-Colman Co.* 28-page catalog (F 6597) "Uni-Flo Air Distribution Products and Square, Rectangular & Lineal Ceiling Diffusers" describes, illustrates, gives specifications and performance data on Barber-Colman air distribution products.

7. PUMPS & CIRCULATING SYSTEMS. *Gray Co., Inc.* Graco Powerflo 452 Catalog describes and illustrates Powerflo pumps, circulating systems and equipment for spraying or extruding liquids, semi-liquids or semi-solids used in production, construction and maintenance.

8. FLAME ARRESTERS. *Air-Maze Corp.* Catalog sheet gives details of 8 models of Tank Vent Flame Arresters by Air-Maze; includes photos, operating and design data, and complete specifications with "how to specify" information.

9. GEARS & SPROCKETS. *Universal Gear Works, Inc.* 200-page comprehensive catalog gives specifications and prices on over 8,000 stock items including gears, sprockets, chains, splines, etc., shows pictorially the Universal manufacturing facilities.

10. STEEL BUILDINGS. *Brookville Manufacturing Co.* Bulletin "Brookville 102" describes, illustrates and gives design features of Brookville All-Steel Buildings; includes general specifications.

11. ELECTRIC PLANTS. *Multi-Matic Corp.* 4-page catalog (G-3155) illustrates complete line of 23-Gen-A-Matic electric plants. (AC and DC), illustrates some of the line, shows typical uses, gives in chart form specifications and a table of power requirements.

12. CENTRIFUGAL PUMPS. *Worthington Corp.* 8-page 2-color bulletin (1230-B1) gives complete data on construction, specifications and component parts of the Blue Brute Contractors' Portable Self-Priming Centrifugal Pumps; rating charts show performance requirements.

13. LUBRICANTS. *The Alpha Corp.* Field Report #140 gives "how-to" discussion on lubrication of engines and compressors with "Molykote Type G" molybdenum disulfide.

14. AIR POWER SYSTEM. *Ingersoll-Rand.* 6-page fan-fold engineering service bulletin (213-A) "A Better Air Power System," includes tables, photos, diagrams; describes how to find if more air is being wasted than repair and renovation of distribution system would cost; tells step by step procedures to bring system up to accepted standards.

15. TRACTOR-SHOVEL. *Frank G. Hough Co.* 16-page 2-color folder (258) describes, illustrates with diagrams and in-action photos, and gives specifications for the model HM Payloader 1½ cu. yd. 4-wheel drive with torque converter.

16. MOTORPUMPS. *Ingersoll-Rand, Cameron Pump Div.* 24-page 3-color bulletin (7093-E) covers the entire line of close-coupled Motorpumps from ¾ to 75 horsepower sizes for delivery of 5 to 2800 gallons per minute; includes tables of dimensions, weights, performances and mountings.

17. SURFACE PREPARATION. *Metalweld, Inc.* Illustrated 2-color bulletin points out the importance of proper surface preparation in all coating or painting applications; photos show sandblast jobs; brief description on methods used by MW Protective Coatings Div.

18. INDUSTRIAL HOSE. J. N. Fauver Co. 24-page catalog (55) "Industrial Hose, Assemblies, Couplings, Stems, Swivels and Accessories" describes, illustrates, gives specifications and engineering data.

19. PORTABLE COMPRESSOR. *Le Roi Div. Westinghouse Air Brake Co.* 12-page catalog (CG-9A) pictures all 40 models of portable type compressors; quick reference chart shows capacities, engine types and mountings available.

Reader Service Department **MAY, 1955**
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Here's what RUST-OLEUM can do for you: (1) Cut your maintenance costs by saving you time, labor and money... because RUST-OLEUM may be *applied directly over rusted surfaces* by brush, dip or spray after wirebrushing and scraping with sharp scrapers to remove rust scale and loose rust! Costly sandblasting and chemical pre-cleaning are not usually required. (2) RUST-OLEUM *lasts longer* applied over surfaces already rusted. (3) RUST-OLEUM'S tough, elastic, rust-resisting film protects signal equipment, rolling stock, towers, bridges, metal buildings and all rustable metal surfaces. Get the complete story from a RUST-OLEUM Railroad Rust Preventive Specialist! See why major railroads throughout the nation rely on RUST-OLEUM.

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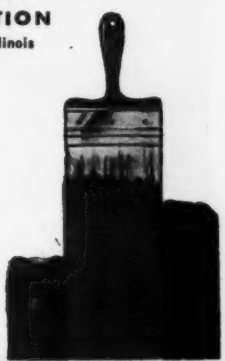
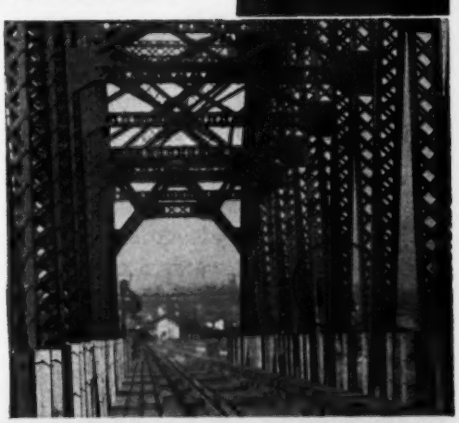
2548 Oakton Street • Evanston, Illinois



May be applied directly over rust



Available in all colors, Aluminum and White

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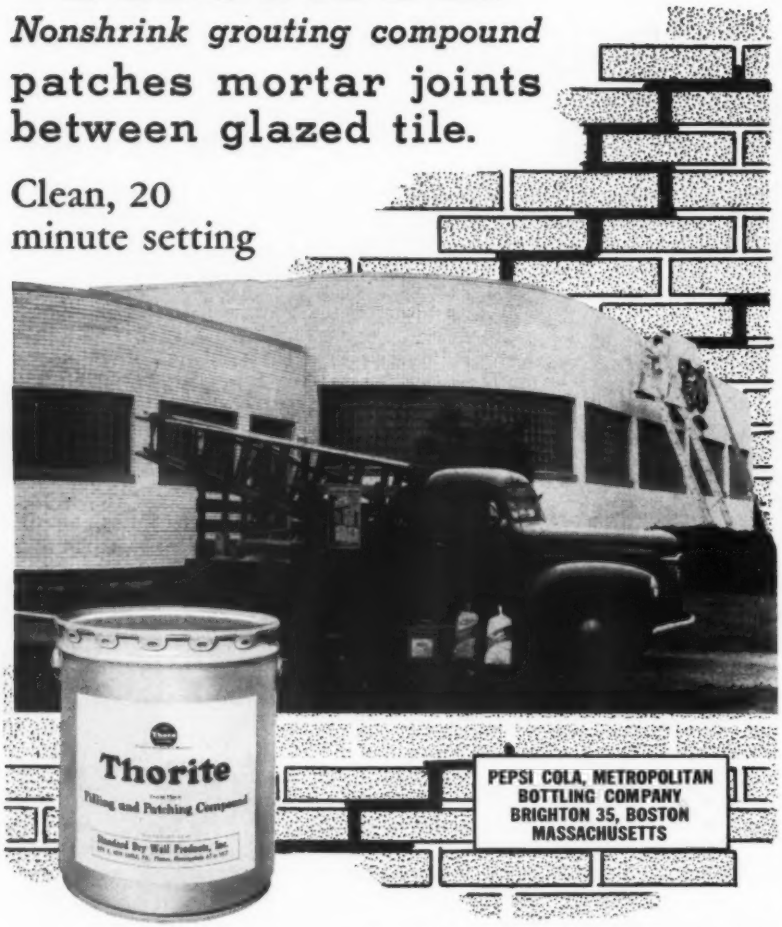
Nonshrink grouting compound

patches mortar joints between glazed tile.

Clean, 20 minute setting



valuable for many uses!

Use THORITE for patching blistered concrete, where reinforcing rods are exposed and corroded, for patching cornices, sills, lintels, belt courses, grain elevators, bridges, underpasses, reservoirs, dams, water filtration plants.

SECURING REINFORCING RODS INTO CONCRETE

Surface and reinforcing rods are sandblasted and thoroughly cleaned. An application of Thorite, by brush, over rods and concrete, previous to filling patch with Thorite, by trowel, is made.

Get our pictorially described literature
"HOW TO DO IT"
STANDARD DRY WALL PRODUCTS INC.
NEW EAGLE, PENNSYLVANIA

Association News (Cont'd)

(AFofL) have been extended beyond the expiration date of January 23, 1955, and the agreements now are being revised.

The membership also discussed plans for enlarging the association, and took up the possibility of distributing its bi-weekly Bulletin to chiefs of engineering departments of all major railroads and to all government agencies concerned with the construction, maintenance and rehabilitation of railroad facilities on government property.

American Railway Engineering Association

Chairmen of the association's standing and special committees, as well as vice-chairmen of those committees which will change chairmen in 1956, met with President G. M. O'Rourke and members of the Board of Direction at the Chicago Engineers' Club on April 26. The purpose of the meeting was to review committee and association procedure in the interest of the greatest efficiency and effectiveness in the handling of committee work. The meeting was concluded at noon with a luncheon at the club.

The Board of Direction has approved, in principle, the publication of a brochure for distribution to the undergraduates in engineering colleges and universities around the country. The booklet will be designed to stimulate interest among students in the opportunities afforded in a railroad engineering career. It is expected that the brochure will be comparable to the attractive career literature being made available to engineering students by other industries.

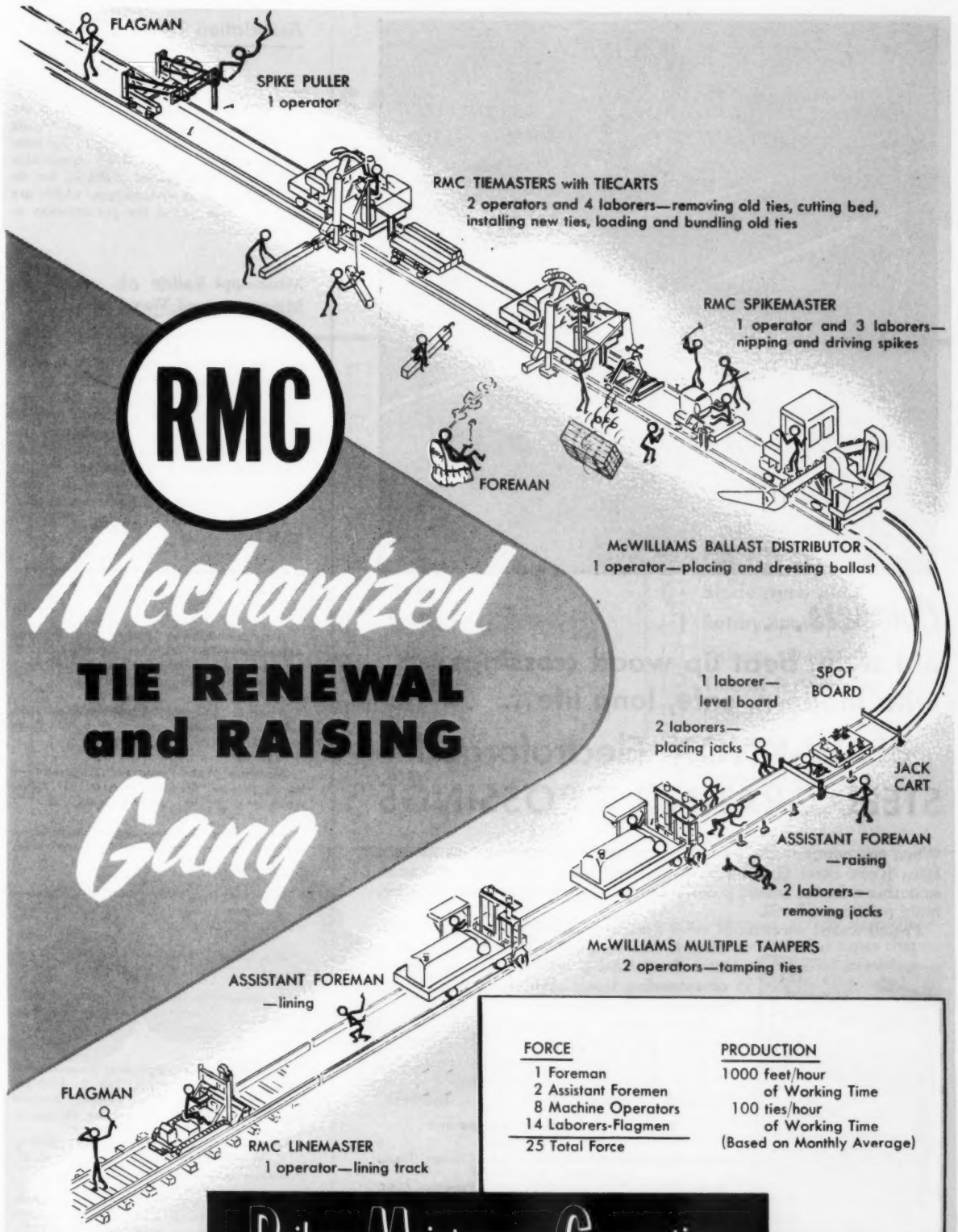
At the time of going to press three committees have scheduled meetings to be held during the month of May. They are: Roadway and Ballast—Nashville, Tenn., May 3 and 4; Economics of Railway Labor—St. Louis, May 9; and Maintenance of Way Work Equipment—Jackson, Mich., May 16 and 17 (tentative).

Roadmasters Association

Important business of the association will be discussed at a meeting of the Executive committee to be held at the Engineers' Club, Chicago, on May 23. Aside from routine business, the committee will discuss preliminary plans for the annual convention, to be held on September 19-21, at the Conrad Hilton Hotel, Chicago, and will review preliminary drafts of the reports of the subjects committees which are being prepared for presentation at the convention.

Bridge & Building Association

The next meeting of the Executive committee will be held on June 27 at the Chicago Engineers' Club. In addition to routine business, there will be two major items on the agenda. One of



RMC

Mechanized TIE RENEWAL and RAISING Gang

FORCE	PRODUCTION
1 Foreman	1000 feet/hour of Working Time
2 Assistant Foremen	100 ties/hour of Working Time
8 Machine Operators	(Based on Monthly Average)
14 Laborers-Flagmen	
25 Total Force	

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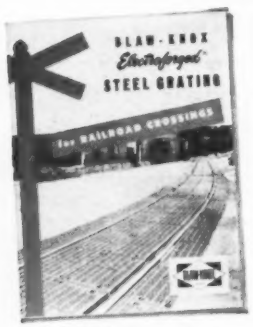
Prefabricated sections of steel grating easily installed and maintained. One section can be removed at a time for tamping tracks, cleaning ballast or removing ties . . . without holding up train or vehicle traffic.



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Open mesh, self-cleaning construction permits good drainage, quick evaporation of snow and water . . . preserves life of ties.

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RAILROAD GRATING APPLICATIONS: crossings • walkways • running boards steps • tower platforms • exhaust fan guards • battery box shelves

these will be a discussion of plans for the annual convention to be held on September 19-21 at the Conrad Hilton Hotel, Chicago. As the other major item of business, the Executive committee will review preliminary drafts of the reports of subjects committees, which are now being prepared for presentation at the convention.

Mississippi Valley Maintenance of Way Club

The May meeting of the club will be held on the 9th at the Hotel DeSoto in St. Louis. The program will include an address entitled "Off the Track" by A. Carl Weber, La Clede Steel Company, St. Louis. The business meeting will be devoted in part to the election and installation of officers for the coming year. Due to the change to Daylight Savings Time in St. Louis, the hours of the meeting May 9 will be as follows: Social hour —6:00 pm (CDST); Dinner—7:00 pm (CDST).

Organizations

American Railway Bridge and Building Association—Elise LaChance, Secretary, 431 S. Dearborn street, Chicago 5. Next annual meeting, September 19-21, 1955.

American Railway Engineering Association—Neal D. Howard, Secretary, 59 E. Van Buren street, Chicago 5.

American Wood-Preservers' Association—W. A. Penrose, Secretary-treasurer, 839 Seventeenth street, N. W., Washington 6, D. C.

Bridge and Building Supply Association—L. R. Gurley, Secretary, 201 North Wells street, Chicago 6.

Maintenance of Way Club of Chicago—E. C. Patterson, secretary-treasurer, Room 1512, 400 W. Madison street, Chicago 6.

Metropolitan Maintenance of Way Club—Secretary, 30 Church street, New York.

Mississippi Valley Maintenance of Way Club—P. E. Odom, Secretary-Treasurer, Room 1008, Frisco Building, 906 Olive street, St. Louis 1, Mo.

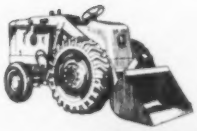
National Railway Appliances Association—Kenneth Cavins, Secretary, 310 S. Michigan avenue, Chicago 4; Lewis Thomas, Assistant Secretary, 59 East Van Buren street, Chicago 5.

Northwest Maintenance of Way Club—L. C. Blanchard, secretary-treasurer, Room 27, Milwaukee Depot, Minneapolis 1, Minn.

Railway Tie Association—Roy M. Edmonds, Secretary-Treasurer, 1221 Locust street, St. Louis 3, Mo. Next annual meeting, October 26-28, Peabody Hotel, Memphis, Tenn.

Roadmasters' and Maintenance of Way Association of America—Elise LaChance, Secretary, 431 S. Dearborn street, Chicago 5. Next annual meeting, September 19-21, 1955.

Track Supply Association—Lewis Thomas, Secretary, 59 E. Van Buren street, Chicago 5.



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They do these OPERATIONS:	—Handle these MATERIALS:	—With these ATTACHMENTS:
☐ Dig	☐ Earth	☐ Standard buckets
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Supply Trade News

General

L. K. Stringham, chief engineer of the **Lincoln Electric Company**, Cleveland Ohio has been named vice-president in charge of engineering. **George Landis**, engineering vice-president, has been appointed vice-president in charge of research.

Mr. Stringham joined the Lincoln organization in 1933, immediately following his graduation from Cornell University with a degree in electrical engineering. His experience in the department which he now heads has included work in all phases of engineering: experimental research, production development, testing and application. Prior to his advancement to chief engineer in 1951, Mr. Stringham had been director of welding development.

The **A. M. Byers Company** has announced the formation of a new sales-order department which will consolidate the firm's sales and order operations into a single department. Manager of the new department is **L. G. Hubbell**. **C. H. Flinn** will serve as assistant manager.

The **American Hoist & Derrick Company** has acquired the **Thomas Laughlin Company**, Portland, Me., manufacturers of forged wire rope accessories, as the first step of a planned expansion program. The plant will be operated as a division of American Hoist.

W. J. Hayes, Jr., sales manager of the **Industrial Brownhoist Corporation**, has been named vice-president, sales and **E. W. Taylor, Jr.**, chief engineer, has been named vice-president, engineering.

E. W. Kush has been appointed sales agent for the Railway Appliance Division of **True Temper Corporation** at Omaha. He will serve railroads having headquarters in Omaha and Denver.

John C. Elmburg, manager of the Portland, Oregon, branch of Fairbanks, Morse & Co., has been appointed assistant general sales manager at Chicago, succeeding **Harry L. Hilleary**, who is to retire June 30. **William F. Wahlenmaier**, electrical department manager, has been named Portland branch manager, replacing Mr. Elmburg.

Mr. Elmburg, a veteran of 26 years with the company, has served as a technical assistant, field engineer, apartment manager and manager of the firm's Boston, Atlanta and Portland branches.

Mr. Hilleary has been with Fairbanks-Morse for 35 years, beginning as a field engineer and subsequently serving as eastern sales manager, Railroad Division, branch manager at St. Louis and most recently as assistant general sales manager.

Mr. Elmburg joined the company in 1939 as a technical assistant in the pump and electrical department at Portland. He has been electrical department manager at that point since 1954.

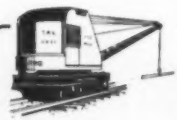
Odis Small, Jr., formerly with the Electromotive Division of General Motors Corporation, has been appointed manager of railroad sales for the Harnischfeger Corporation. A mechanical engineering graduate of Virginia Polytechnic Institute, Mr. Small will head up the promotion and coordination of all railroad sales activities on P&H products.

Burro Cranes are the busiest units on the road because they can work anywhere . . . do virtually anything . . . and do it faster at lower cost. Burro's low overall height and short tail swing permit efficient operation on a flatcar . . . fast travel speeds and powerful draw bar pull give it a wider operating range on the track.

Write for Bulletins on Burro Cranes

***Only* BURRO Cranes Give You All These Advantages**

- **Fast travel speeds . . . up to 22 MPH**
- **Draw bar pull of 7500 lbs. (often eliminates need for work train or locomotive)**
- **Elevated Boom Heels for working over high sided gondolas**
- **Short tail swing — will not foul adjoining track**
- **Low overall height — Burro can be loaded and worked on a standard flatcar.**



CULLEN-FRIESTEDT CO.
1301 South Kilbourn Avenue • Chicago 23, Ill.

the NEW NORDBERG *Automatic* GANG TAMPER

Here are some of the reasons why this tamper is the most talked-about machine today:

The Nordberg Automatic Gang Tamper delivers high production quality tamping in raising and spot surfacing. Ballast under every tie gets exactly the same tamping. One man operates the machine with two push-buttons. One of these starts the tamping cycle . . . and *automatically* the tamping heads are dropped, impacted, vibrated, lifted—a pre-set number of times—and the machine *automatically* moves forward. The operator then stops the machine over the next tie by merely touching the second push-button. Tamping is again resumed.

The completely automatic tamping cycles can be easily varied to meet specific ballast conditions. Automatic control can also be interrupted at any time, and switched to manual operation.

Here, then, is your assurance of uniform quality tamping of every tie, every time, in any ballast, whether raising or spot surfacing. Write for descriptive brochure.

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R655

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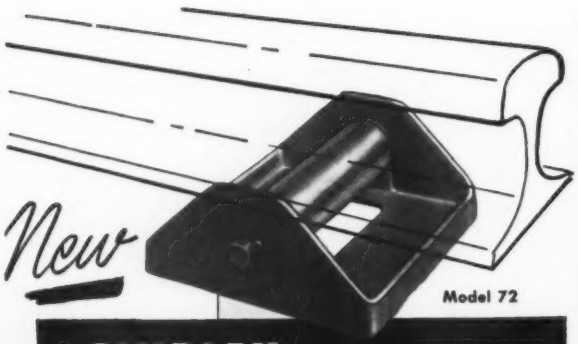

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RAIL DOLLY
Makes Rail Bumping Faster, Easier, Safer

A REAL WORK-SAVER WHEN:

- Removing Rail
- Installing New Rail
- Lining Up Bolt Holes
- Driving Up Expansion
- Adjusting Switch Points
- Installing Welded Rail

• The Rail Dolly is a heavy-duty roller mounted on a low metal stand. Used in pairs, Rail Dollies handle the heaviest of bumping rails —make accurate bumping possible with less men. Cut damage to rail ends. Far safer than swinging rails with tongs or sliding on greased plates. Guides on each side of Dolly stand prevent rail from slipping off; cleats in base anchor Dolly firmly on top of ties or ballast. Another aid in driving rail, the Simplex Rail Puller and Expander, prevents rail from returning to its original position after bumping. Both devices described in Bulletin RR 72. WRITE:

TEMPLETON-KENLY & CO.
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USE Q AND C ONE PIECE MANGANESE GUARD RAILS TO ASSURE SAFETY AND ECONOMY

The design and rugged construction of The Q and C One-Piece Guard Rail assure strength, safety, durability and economy. They are easy to install and a minimum of maintenance is required, resulting in reduced costs.

Q and C Guard Rails are well braced to resist thrusts of the heaviest equipment and are made of full manganese steel for various rail sizes.

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- STOCKPILE
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Portable Kwik-Mix Mixers economically produce bituminous mix at any location to build and maintain smooth grade crossings, walks, platforms, parking areas. These mobile mix plants on pneumatic tires do direct pouring into pot holes on small quantity patchwork. Equipped with Kwik-Mix tower loader (above) they stockpile materials at various job sites, or load trucks. Tower discharges at heights to 8 ft.-9 in. Mixers also mount on skids on elevated platforms as stationary central-mix plants. 2 sizes — 10 and 14 cu. ft.

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Specify Lewis Loktite Speed Holding Nut #2 for positive lock . . . no other nut required. Equals tensil strength of bolt. Trimmed sides provide a close wrench fit. *For Double-Life, fewer replacements, specify Hot-Dip Galvanized finish!*

Side view, reduced, showing areas of friction lock.

See your Lewis representative, or contact factory for further details.

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D9

230 HP (Drawbar)

56,200 LB.

Another example of Caterpillar leadership in action

THE D9... PROVEN IN THE FIELD FOR A YEAR!

Though new, the CAT* D9 is already a veteran. After exhaustive proving-ground tests, several D9s have been tested for over 19,128 hours on the toughest jobs in logging, construction, mining and quarry work. These jobs tested every inch of this mighty new machine. The word from the field: "By far the best big tractor ever made."

RUGGED—AND EASY TO SERVICE!

From its one-piece welded steering clutch case-frame assembly, to its track shoes hardened by the "Water Quench" process, the D9 is the toughest crawler built. And, it's designed for easy servicing. Oil clutch, torque converter, transmission case and steering clutches can each be removed individually without disturbing other components. Hydraulic track adjusters make service easier, too.

EASY TO OPERATE!

—The independent "live shaft" drive for cable controls makes operation smoother, easier.

—Hydraulic boosters provide power steering *and* braking.

—Adjustable seat, all-around visibility, easy access to all controls make operator's job simpler.

—7-roller track frame improves stability and ride.

—New starting engine has electric starting system and simple single-lever control for easy operation from the seat, and insures fast starts in all weather.

All in all, the new D9 sets a new standard of big, money-making, earthmoving performance. Get the full facts about this rugged giant from your Caterpillar Dealer.

FAST FACTS ON THE D9

FIRST TRACK-TYPE TRACTOR WITH TURBOCHARGER! The D9's new Turbocharger is driven by the engine exhaust, utilizing energy which would otherwise be lost. Packs air into engine according to engine *load*, not speed; means more working HP — greater performance.

CHOICE OF TORQUE CONVERTER OR DIRECT DRIVE! Two types of drive are available, the exclusive Caterpillar oil clutch with six-speed (forward and reverse) transmission or a three-stage torque converter with 5:1 torque ratio. The transmission used with the torque converter has three speeds forward, two reverse. This option enables you to match the drive you want to your job requirements.

COMPLETELY NEW 286-HP ENGINE! In addition to the Turbocharger, the powerful new D9 Engine features a 6¼" bore and 8" stroke and runs at 1200 r.p.m. Long life and dependability are promoted by stationary oil jet piston cooling; short, rigid valve push rods give smooth, accurate valve action; "Hi-Electro" hardened gear at rear of crankshaft drives timing gears and accessories; other advanced features.

WIDE RANGE OF OPERATING SPEEDS!

Torque converter: 3 speeds forward, 0 to 4.1 m.p.h., 0 to 5.7 m.p.h., 0 to 7.8 m.p.h. • 2 speeds reverse, 0 to 4.1 m.p.h., 0 to 7.8 m.p.h.

Direct drive: 6 speeds forward, 1.6, 2.1, 2.9, 3.9, 5.0, 6.8 m.p.h.
6 speeds reverse, same

CONSTANT-POWER DRIVE FOR REAR-MOUNTED EQUIPMENT! You always have power for cable controls, direct from the engine's rear power take-off. This makes cable control operation completely independent of flywheel clutch or torque converter, boosts operating efficiency.

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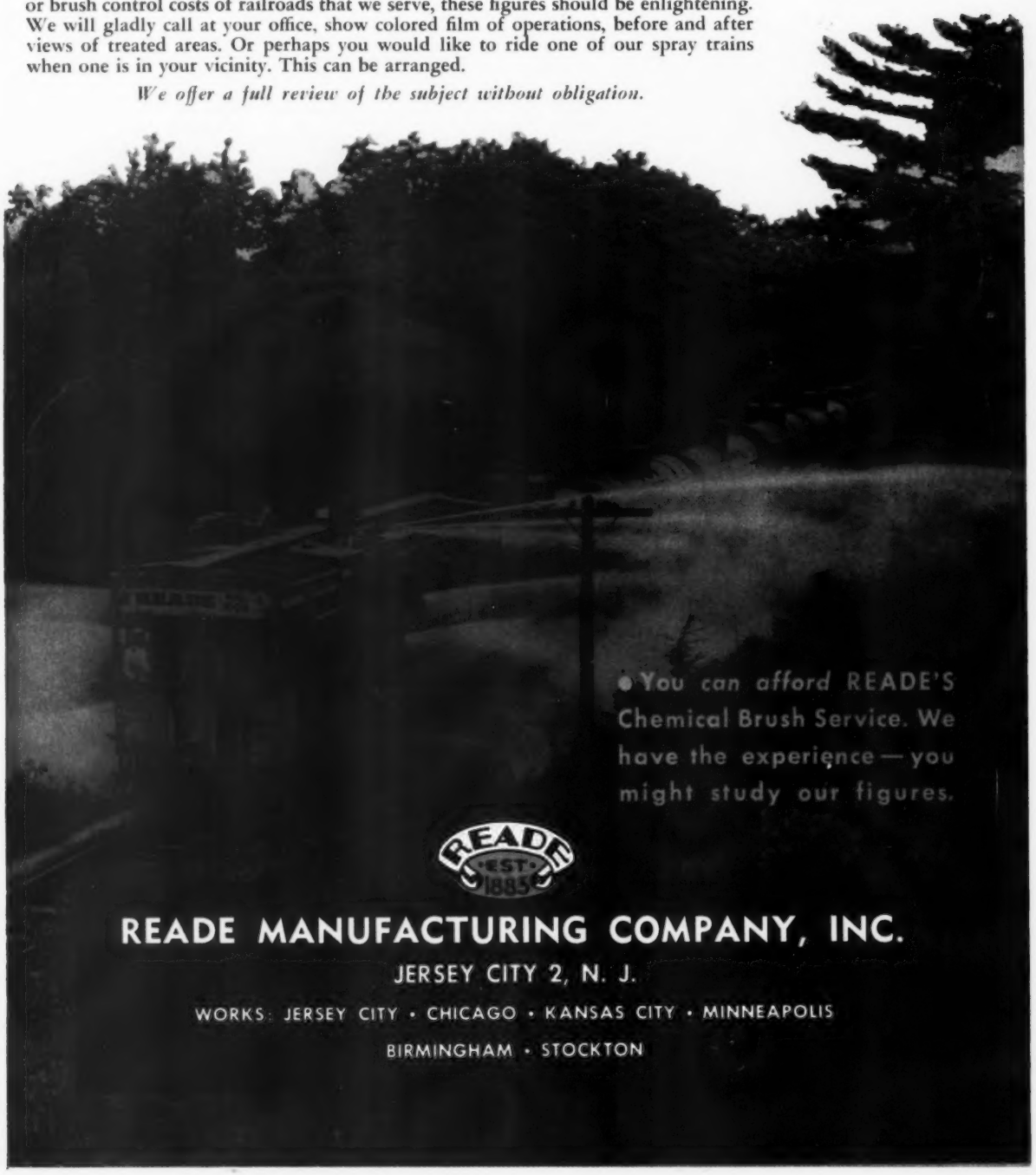

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